Quartz-Cottonwood Road Project Environmental Assessment

April 2004

Idaho Panhandle
National Forests
Priest Lake Ranger District

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
AIRFA	American Indian Religious Freedom Act
APE	area of potential effect
ARPA	Archaeological Resource Protection Act
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
DEQ	Department of Environmental Quality
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FSR	Forest Service Road
ICDC	Idaho Conservation Data Center
IDFG	Idaho Department of Fish and Game
INFISH	Inland Native Fish Strategy
IPNF	Idaho Panhandle National Forests
LAU	lynx analysis unit
LWD	large woody debris
MIS	Management Indicator Species
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
P.L.	Public Law
PVC	polyvinyl chloride
RHCA	Riparian Habitat Conservation Area
RM	river mile
RMO	Riparian Management Objective
ROW	right-of-way
SAIC	Science Applications International Corporation
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
USFS	United States Department of Agriculture Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

ENVIRONMENTAL ASSESSMENT

QUARTZ COTTONWOOD ROAD PROJECT

United States Department of Agriculture Forest Service
Priest Lake Ranger District
Idaho Panhandle National Forests

APRIL 2004

TABLE OF CONTENTS

FIGURES

TABLES

CHAPTER 1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The National Environmental Policy Act (NEPA) requires federal agencies to identify and consider the potential environmental impacts of their proposed actions before they make final decisions on those actions. The Idaho Panhandle National Forests (IPNF) manage approximately 2.5 million acres of National Forest System lands in northern Idaho, and maintains approximately 8,500 miles of roads on those lands.

The IPNF proposes to upgrade approximately 22 miles of single lane, unsurfaced or gravel road to meet current United States Department of Agriculture Forest Service (USFS) standards for low volume access roads. The existing roads, located in the Priest Lake Ranger District of the IPNF, are currently subject to surface erosion, which in turn affects water quality and the health of the local fisheries. In addition, the roads require upgrading to allow more reliable all-season use, access to numerous private in-holdings, and access to National Forest System land.

1.2 PROPOSED ACTION DESCRIPTION

IPNF proposes to upgrade approximately 22 miles of single lane, unsurfaced or gravel road to meet current USFS standards for low volume access roads. This action is proposed for the Quartz-Cottonwood area on the southern end of the Priest Lake Ranger District, Idaho. The proposed project area can be accessed from State Highway 57 (Figure 1-1).

The Quartz-Cottonwood Road Project lies between approximately 9 and 14 miles northwest of the town of Priest River, and south of Priest Lake, in the Kaniksu National Forest, Bonner County, Idaho. The project area starts just upstream from McAbee Falls on the Lower Priest River, at about river mile (RM) 13.8, and ends at about RM 21. Dubius, Murray, Cottonwood, Quartz, Steep, Peewee, Benton, Fox, and Prater Creeks pass through the project area and flow into the Lower Priest River. Moores Creek passes through the project area and flows into the Lower West Branch Priest River. Jasper Mountain (3,873 feet) is the highest point on the west side of the Lower Priest River, and forms a central feature around which the road system circulates.

The proposed action concerns three roads: Forest Service Roads (FSR) 416 (Quartz Creek); 239 (Cottonwood), and 334 (Gleason McAbee). FSR 334 begins near McAbee Falls, passes east of Jasper Mountain, generally following Priest River, and intersects FSR 239 near the confluence of Murray and Cottonwood Creeks. FSR 416 heads east from Highway 57 and then south around Jasper Mountain to intersect FSR 334 at the southern side of Jasper Mountain. FSR 239 runs from where FSR 416 turns south, north along Cottonwood Creek and then Murray Creek. Approximately 3.2 miles of Gleason McAbee and 0.4 miles of Quartz Creek Roads are under Bonner County jurisdiction and are not included in the proposed action.

In addition to the 22 miles of roads, the two alternatives considered in this environmental assessment (EA) encompass one rock pit and three quarries with a total combined area of

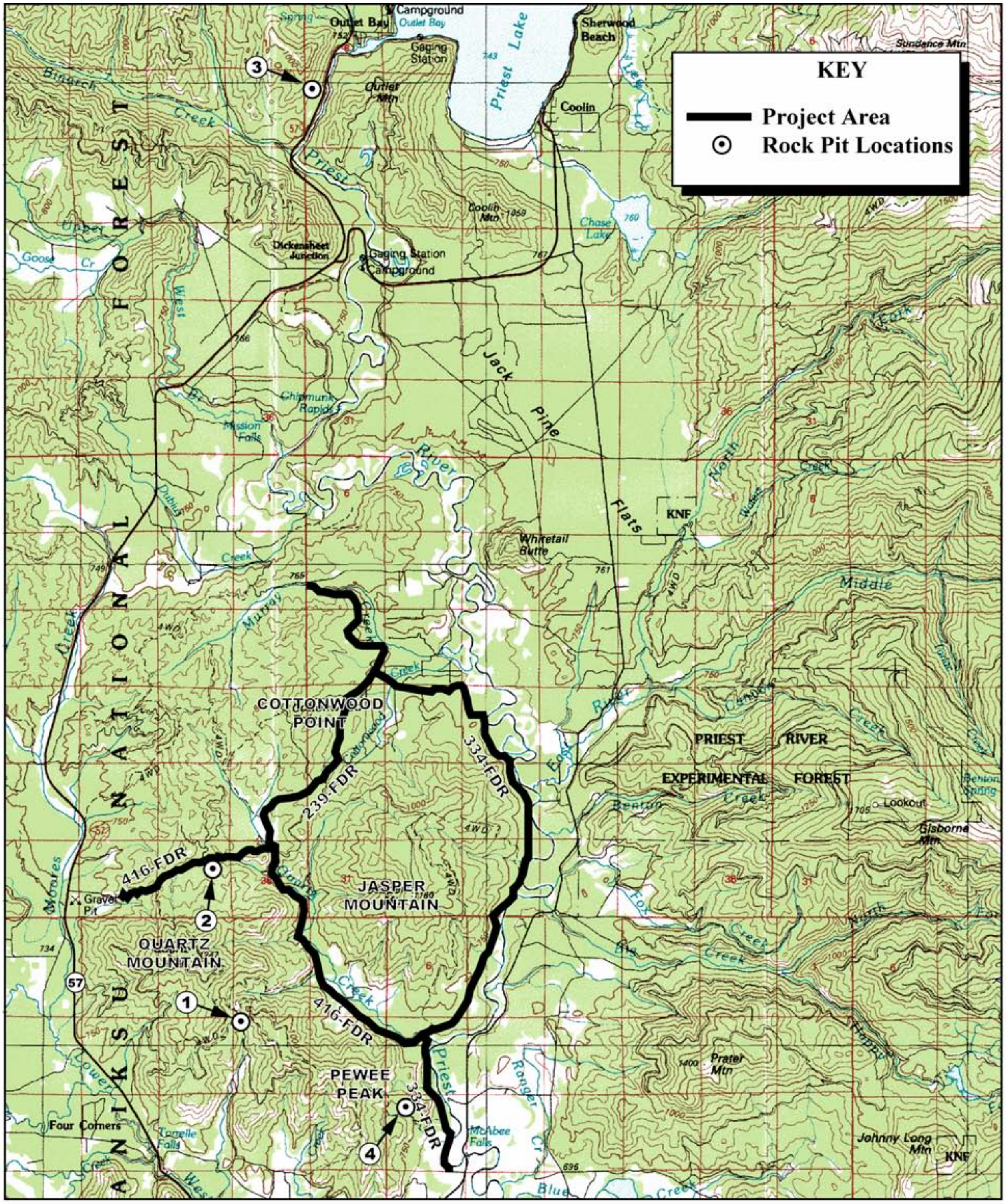
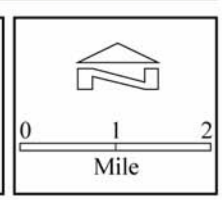


Figure 1-1.
Project Location, Quartz-Cottonwood Road Project,
Priest Lake Ranger District, Idaho Panhandle National Forests
(U.S.G.S. 30X60", SANDPOINT, IDAHO-MONTANA)



approximately 35 acres. As well as expanding two existing rock quarries, the proposed action would develop an additional rock quarry in the main project area and a new rock pit in the Binarch Creek area, also accessible from Highway 57 and located to the north of the primary project area. The quarries are adjacent to existing roads with the exception of the proposed new quarry near McAbee Falls, which will require a new access road of approximately 0.1 mile.

1) **Peterson Road Quarry Expansion** (T57N, R5W, S24, approximately 5 acres) is along Peterson Road.
2) **Jasper Quarry Expansion** (T58N, R5W, S36, approximately 5 acres) is a forested knob with a level parking area on the north side running parallel with FSR 416.
3) **Binarch Pit** (T59N, R4W, S7 and 12, approximately 20 acres) is located just west of Highway 57 in an area that, based on tree size, appears to have been cut within the last 10 to 15 years. The proposed pit is bordered on the north, west, and east sides by a plowed road cut, and on the south side by a line of mature trees.
4) **North of McAbee Falls** (T57N, R4W, S18, approximately 5 acres) would be a new quarry between south FSR 334 and an existing quarry.

For the most part, project area roads are currently graded, but unsurfaced. Proposed road upgrades would result in a crushed aggregate surface (personal communication, Klatt 2003). The road upgrade includes the creation of additional turnouts and one major and several minor realignments. Approximately 5 to 6 miles of the road involve easements through private land (IPNF 1982; USFS 1985a, 1993; Bonner County 1934), with the remainder on National Forest System land. In most locations, the existing road is between approximately 12 and 16 feet wide; on private property the easement is either 33 feet or 66 feet. Reconstruction and maintenance activities to address road conditions include raising the grade in some locations, surfacing, drainage improvements, and the addition of turnouts.

There are approximately 19 “live” creek or stream crossings where the culverts will be evaluated for upgrading or replacement. Damaged or poorly placed pipes may be replaced, and culverts may be added. Additional ditch relief culverts that drain the road or springs will also be upgraded to appropriate diameters or relocated as needed, reflecting the final road design and sediment control objectives of this project.

Conditions of the road system vary. Most of the road has a native surface, which can include “pit run” surfacing. Pit run is aggregate from a designated source of suitable quality that requires minimal processing (personal communication, Jackson 2004). Crushed aggregate surfaces are found near junctions with county and private roads. The road grade varies from straight and flat to curves with steep climbs or descents. Typical problem conditions on to the existing road include areas where the road fill is sloughing or has failed, live creek crossings where the grade is sagging (USFS 1985b, 1989, 1992a, 1992b), and areas where runoff crosses the road. There are numerous existing turnouts, and additional likely locations will be identified.

The USFS will complete the engineering design work for this proposed road project following completion of the EA. This approach allows the engineers to incorporate specific road knowledge gained during the assessment process into the final design, thus avoiding expensive and time-consuming redesign. The design phase begins with development of a "Preliminary Engineering Report" that incorporates requirements and mitigations recommended in the EA. The design always employs Best Management Practices (BMPs) and adheres to both good engineering practice and standard specifications. The USFS ensures the Preliminary Engineering Report is reviewed by specialists for NEPA compliance and completeness (personal communication, Jackson 2004).

1.3 PURPOSE AND NEED FOR ACTION

The purpose of the Quartz-Cottonwood Road Project arises from USFS policy. The IPNF District Road Management Plan (IPNF 1987:Appendix R) states, "all roads on National Forest lands shall remain open for public use unless there are sound reasons in the interest of the public and/or resource protection for their closure". Goal 21 states that "Roads will be developed and managed to the minimum standards and miles necessary to meet the objectives of the management areas" (IPNF 1987).

The Forest plan also provides direction for the maintenance of roads in its objectives:

> Objective Q. Access to National Forest lands will be obtained and maintained in accordance with established Forest Service policy for the protection, administration, and utilization of the National Forests and their resources. Private landowners will not be denied reasonable access to their property, if unavailable across private land, subject to compliance with applicable regulations and Forest Service policies. Continuous private land access rights may be preserved by means other than cost sharing. Cost sharing of jointly used roads will be continued in accordance with Forest Service policies. Private uses of National Forest land will be permitted when in compliance with Forest Service regulations and policies.
>
> Objective R, Facilities. Transportation facilities will be constructed, managed and maintained to meet the management area goals in a cost effective way while meeting safety, user and resource needs. Best management practices for road construction will be utilized during construction and maintenance of transportation facilities. Transportation facilities include roads, railroads, trails and airfields.
>
> The Forest's transportation system will be coordinated and integrated with public and private systems to the fullest extent possible. [IPNF 1987]

These objectives are reiterated in the Forest Plan's "Forest-Wide Management Direction" (IPNF 1987:II). Estimated activities for the period from 1988 through 2007 include the reconstruction of 84 miles of local access roads (IPNF 1987:Table II-1), a category that includes the roads within the Quartz-Cottonwood Road Project.

Although the operational maintenance level currently assigned to the Quartz-Cottonwood road system falls within the parameters for a level 2 road (low maintenance), the USFS has classified it at the objective maintenance level of a level 3 road. This level is consistent with the kind of use these roads receive, consisting of mixed local, recreational, and some commercial traffic.

Dust, lack of turnouts and inadequate sight lines create unsafe conditions relative to the amount of traffic (personal communication, Klatt 2004). A level 3 road is "open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities" (USFS 1995). Level 3 roads can be arterial, collector or local roads. The Quartz-Cottonwoods roads are considered collector (serving a smaller land area than an arterial road, usually connecting forest arterial roads to local forest roads) or local (connecting terminal facilities with forest collector roads).

Level 3 roads are distinguished from other level roads by the aggregate of their maintenance standards. Level 1 roads are the least maintained and may be closed, have no maintenance, or have stringent restrictions on season of use and vehicle type. Level 5 roads are maintained to the highest level, often with pavement, lane striping, and with a goal of maintaining a high degree of user comfort and convenience (USFS 1995:Exhibit 12.6.01). Maintenance of level 3 roads shares some characteristics with other road classes, but generally the roads may be surfaced with aggregate, may have maintained shoulders, should have drainage facilities that are functional and prevent unacceptable environmental damage, have roadside vegetation maintained and road damage repaired, hazards removed and/or cleaned up, but may have non-critical work delayed for efficient planning.

Based on the purpose described, two primary conditions drive the need for this action: the poor state of the roads relative to their level of use, and the effect that this poor condition has on the streams and biota along the road routes. First, the deteriorating roads create unsafe conditions for public use, requiring improvements for the well-being of users. Although the road is meant to be maintained to the condition of a level 3 road to accommodate the mixed local, recreational and commercial traffic it receives, currently it does not meet these standards. Poorly draining road segments and improperly sized or blocked culverts cause muddy spots in the road that become rutted and unsafe. In some instances blocked culverts or lack of drainage structures cause run-off to flow across the road surface, leading to potentially dangerous wash-outs. Surface erosion on the roads contributes to the roads' deterioration. Dust, lack of turnouts, and limited sight distance contribute to these unsafe road conditions. Improving and maintaining these roads will accommodate all-season use, provide access to numerous private in-holdings, as well as administrative and recreation access to National Forest System land.

Second, washouts, erosion, and poorly functioning drainage devices affect water quality in the watershed by introducing excessive sediment into the streams intersected by the roads. During the summer dry season, dust from the roads creates short-term visibility and air quality concerns. Culvert upgrades and replacements at live stream crossings will address potential issues related to fish passage. This proposed road project will address the need to upgrade both the road surface to reduce erosion and the drainage system to allow appropriate fish passage.

The three rock quarries identified as sources for the crushed aggregate to surface the roads are within a mile or less of the Quartz-Cottonwood road system. The fourth source, the Binarch Pit, lies about 7 miles north of the project area. These sources are needed to provide rock for the upgraded road surface as well as potential future projects. Among the four rock sources, the

IPNF has access to the varying grades of rock required to complete the road project, while minimizing transportation costs.

1.4 POLICY DIRECTION AND LEGAL GUIDANCE

This action is governed by a suite of environmental laws and regulations. NEPA, National Forest Management Act (NFMA), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508) all apply directly. Other applicable laws and regulations include but are not limited to the Clean Water Act, Endangered Species Act (ESA), Clean Air Act, National Historic Preservation Act (NHPA), Environmental Justice (Executive Order [EO] 12898), Floodplain Management Act (EO 11988), and Protection of Wetlands (EO 11990).

In addition, the USFS has a number of relevant regulations. Forest Service Manual Title 1900 provides the foundation for all planning in the USFS. The goal of this instruction is to integrate and coordinate efforts with the aim of addressing all levels of planning within different tiers of the USFS. Chapter 1950, Environmental Policy and Procedures, addresses NEPA compliance procedures. Title 2600, "Wildlife, Fish, and Sensitive Plant Habitat Management," addresses management of National Forest ecosystems through maintaining diverse and productive wildlife, fish, and sensitive plant habitats. Forest Service Handbook 1909 supplements these manuals by providing procedures for implementing land and resource management planning.

Finally, goals, objectives, standards, guidelines, and management direction specific to the IPNF can be found in the IPNF Forest Plan, Appendices, and Amendments.

> The Forest Plan guides all natural resource management activities and establishes management standards for the Idaho Panhandle National Forests. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. [IPNF 1987]

Since its adoption in 1987, the management plan has been periodically updated and evaluated. The latest evaluation was in 2002 (IPNF 2002) and amendments continue: plan amendments (IPNF 2003a), a proposed lynx amendment (IPNF 2003b), and a grizzly bear amendment (USFS 2004a). The management plan is currently undergoing revision in cooperation with Kootenai National Forest (IPNF 2003c). The IPNF has also created a site investigation strategy for heritage resources (IPNF 2003d).

1.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA discusses the proposed action of improving and maintaining roads, with associated aspects such as using two existing quarries and creating one new rock quarry and one new rock pit as sources for road construction materials. Alternatives consist of the no action alternative and the proposed action alternative, which includes the road upgrades, expansion of two existing rock quarries, and the development of one new quarry and one new rock pit. Cumulative effects are also analyzed, taking into consideration other actions contemplated by the USFS or other entities that, when coupled with the effects of the proposed action, may have a potential cumulative effect on resources.

This EA identifies and evaluates the potential environmental impacts of the proposed road project, as required by NEPA. The results of the evaluation will be used by the USFS to determine whether there are significant impacts that require evaluation in an Environmental Impact Statement (EIS) or if the USFS can make a Finding of No Significant Impact (FONSI). The responsible official is the District Ranger, who will make a decision on whether this EA results in a signed FONSI.

1.6 ORGANIZATION OF THIS ENVIRONMENTAL ASSESSMENT

This chapter presents the proposed action and the purpose and need for the action. Chapter 2.0 describes issues raised through the scoping process. The proposed action and no action alternatives are discussed, as are potential mitigation measures and a summary of cumulative effects of the proposed action. Chapter 3.0 presents existing conditions for each environmental resource analyzed, analyzes effects of the proposed action and alternative on each resource, proposes mitigations for potential adverse effects, and addresses cumulative effects for each resource.

CHAPTER 2.0 ISSUES AND ALTERNATIVES

2.1 INTRODUCTION

This chapter presents the IPNF's identification of issues through public scoping and internal procedures (sections 2.2 and 2.3). Section 2.4 presents the issue identification process; section 2.5 describes the process of selecting alternatives, and describes the alternatives in detail. An overview of cumulative effects in presented in section 2.6, followed by determinations of effects and actions to mitigate potential adverse effects presented in section 2.7.

2.2 SCOPING

The IPNF conducted scoping to gather community-specific issues regarding the proposed road project. The scoping period began on August 8, 2003. The purpose of scoping was to identify issues and concerns of interested parties. The IPNF considered comments made by the community when designing the proposed action and alternative, in determining which issues would be brought forward for detailed study by resource, and when considering mitigations for possible effects.

IPNF mailed letters to over 350 recipients, including residents, government agencies, tribal governments, special interest groups, and county and local officials. The letter invited those with specific interests to write letters expressing their concerns, and to attend a public scoping meeting. A news release was also prepared and appeared in the Idaho edition of the Spokesman Review prior to the meeting on August 19, 2003. Approximately 29 citizens attended the scoping meeting, and the IPNF received 22 letters regarding the Quartz-Cottonwood Road Project. The majority of letters and comments supported the proposed project.

Issues identified during public scoping include those listed below, addressed in section 2.4. Potentially affected resources are analyzed in Chapter 3.0.

- Availability of funding for the project, and interest in seeing funding allocated for road improvements;
- Interest expressed in seeing the project completed in a timely manner;
- Concern over dust and air quality due to current road conditions, as well as during improvement work;
- Road jurisdiction and maintenance responsibilities (County or USFS);
- Need for speed limit signs now and in the future;
- Timber harvest within the project area;
- ESA compliance during road construction and resurfacing;
- Avoiding or mitigating cumulative effect;
- Providing fish passage to introduced and competitive species;

- Archaeological monitoring during road construction and resurfacing at high probability landforms, with cessation of construction activities in the event of unintended discoveries (c.f. Native American Graves and Repatriation Act [NAGPRA] and NHPA implementing regulations).

2.3 IDAHO PANHANDLE NATIONAL FORESTS PRELIMINARY ISSUES

Using input from scoping and from USFS management requirements, the IPNF identified a number of preliminary issues, some of which coincide with issues raised during scoping.

- Conveyance of flows from 100-year storm events;
- Fish passage, including threatened and sensitive fish species;
- Sediment loadings to streams;
- Effects on bald eagle winter habitat and nesting sites in the project area;
- Possible introduction of noxious weeds; and
- Potential presence of heritage resources and rare plants.

2.4 RESOURCES SELECTED FOR ANALYSIS

In selecting resources for analysis, the IPNF considered those resources and issues that are key in developing alternatives, are important for resource protection, are subject to impacts or are of interest or concern to the public. The IPNF considered scoping issues and its own preliminary issues to determine what resources would undergo analysis.

2.4.1 Resources Analyzed in Detail

The following resources are analyzed in detail in Chapter 3.0.

Hydrology/Water Quality addresses adequate flow through drainage structures and the interaction between drainage structures, fish passage, and the effects of sediment load on streams.

Fisheries examines the species present in the region, the interaction between drainage structures and fish passage, and the health of the stream in relation to both.

Wildlife. Road construction and improvement projects can have an effect on wildlife through the introduction of additional traffic and effects on water quality. This EA analyzes potential effects on habitat including the introduction of exotic or noxious species, and project effects on threatened and endangered species, including bald eagles.

Vegetation and Noxious Weeds. Construction and associated disturbance can affect habitat and rare plants, and effects can include the introduction of exotic or noxious species. This EA analyzes project effects on vegetation within the project area.

Heritage Resources. Non-renewable, heritage resources are of concern; analysis includes identification and potential effects on heritage resources, as well as protocols for monitoring and actions in the event of unanticipated finds, including the possibility of NAGPRA-related issues.

2.4.2 Resources Not Analyzed in Detail

Air Quality. Air quality issues (e.g., dust) arise from the current conditions on the roads. The proposed road improvements will address these concerns. Short-term effects from construction activities will be addressed through mitigations and BMPs employed during road design, which will occur after completion of the EA.

Socioeconomics. Two concerns identified during scoping, funding and timber harvest, were considered, but not analyzed in detail. Although funds have net yet been allocated for the Quartz-Cottonwood Road Project, the availability of funding for the project is not considered to be an issue requiring analysis. Timber harvest within the project area will continue to be regulated by the Forest Plan. Timber harvests on private land are considered in the cumulative effects analysis.

Transportation. Road jurisdiction and maintenance responsibilities are addressed through cooperative agreements between the IPNF and Bonner County. Maintenance of speed limit and other road signs is a component of upgrading these roads to level 3 standards. Once construction begins, USFS and IPNF policy is to complete the work in a timely fashion. This bears on IPNF's need to minimize the short term effects of dust and travel disruption and follow BMPs. The timeliness and timing of the road work will be considered in this EA and any subsequent planning.

2.4.3 Issue Indicators

Issue indicators are "units of measure that show how the issues are addressed in each alternative" (USFS 2002a). Mitigation measures are included in Table 2-3.

2.4.3.1 EFFECTS TO AQUATIC RESOURCES AND BULL TROUT

Bull trout is currently listed as a threatened species. Road improvements may affect sediment delivery and/or channel characteristics, negatively impacting water quality and fish habitat. Issue indicators used to evaluate and compare the effects of the proposed action and no action alternatives are:

- quantity of sediment delivered to stream;
- changes to channel morphology;
- amount of riparian vegetation removed;
- risk of sediment delivery from roads at stream crossings; and
- number of culverts in fish-bearing streams.

2.4.3.2 EFFECTS TO WILDLIFE AND THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE

Road improvement projects can impact wildlife through increased traffic, construction disturbance, and habitat alteration. Measurements of change used to evaluate and compare the effects of the alternatives on wildlife are:

- acres of suitable wildlife habitat affected by the proposed action;
- presence of special status wildlife species;
- proximity of special status species occurrences to road improvement activities; and
- acres of suitable lynx habitat affected.

2.4.3.3 EFFECTS TO THREATENED, ENDANGERED, AND SENSITIVE AND RARE PLANTS

The primary concern for special status plants is that proposed road construction could affect the viability of rare plant populations. Issue indicators used to assess potential project effects on special status plants are:

- presence of special status plant populations; and
- acres of suitable habitat affected by the proposed action.

2.4.3.4 EFFECTS TO NOXIOUS WEED INVASION AND SPREAD

Proposed road construction and use could spread existing weed infestations and/or cause the introduction of new weed invaders. Issue indicators used to assess project effects on noxious weeds are:

- presence and extent of known weed infestations; and
- amount of ground and canopy disturbance.

2.4.3.5 EFFECTS TO HERITAGE RESOURCES

This measure is not applicable to heritage resources, also known as cultural resources, in the context of the Quartz-Cottonwood Road Project (personal communication, Williams 2004). No significant resources have been located within the area of direct project effects; if any such resources are located, mitigation will consist of avoiding them, so that there will be no measurable effect.

2.5 ALTERNATIVE DEVELOPMENT AND MODIFICATION

2.5.1 Alternative Considered and Not Carried Forward

The IPNF considered one alternative action for the Quartz-Cottonwood Road Project that was not carried forward for further analysis. This option, abandoning all or a portion of the Quartz-Cottonwood roads, would leave private in-holdings inaccessible, and reduce or eliminate IPNF's access to facilities. Furthermore, this area would become inaccessible to many of its recreational users. This alternative is incompatible with USFS land management practices such as continued access to private land and public access to National Forest lands (IPNF 1987 II-35) except in specific cases (e.g., wilderness) (IPNF 1987). For this reason, this alternative was subsequently evaluated as not feasible, and so was not carried forward for analysis. Other options, such as applying the funding to a different road system, were not considered reasonable alternatives to this project, as those possibilities are already addressed through other undertakings.

2.5.2 Alternatives Considered

2.5.2.1 ALTERNATIVE 1: NO ACTION

Under the no action alternative, no specific road maintenance and no road improvements would occur. Maintenance would be in response only to emergencies, with no planning for budgetary or seasonal efficiency, and there would be no preventive actions to avoid further impacts to the road or to resources. The existing rock quarries would not be expanded, nor would additional rock sources be developed specifically for the Quartz-Cottonwood road system. Furthermore, culverts would not be evaluated and modified to meet the goals of either removing, creating, or retaining fish barriers. Sediment would continue to be eroded into the streams, and fisheries would not be enhanced by management of stream flow through the roads. The roads would continue to flood in places and deteriorate through erosion related to use and natural structural decay.

2.5.2.2 ALTERNATIVE 2: PROPOSED ACTION

Under this alternative, IPNF would upgrade approximately 22 miles of single lane, unsurfaced or aggregate-surfaced road in the Quartz-Cottonwood area on the southern end of the Priest Lake Ranger District, between approximately 9 and 14 miles north of Priest River, in Bonner County, Idaho. The project area can be accessed from State Highway 57 (refer to Figure 1-1).

The proposed action concerns three roads: FSR 416 (Quartz Creek); FSR 239 (Cottonwood); and FSR 334 (Gleason McAbee). Approximately 3.2 miles of Gleason McAbee and 0.4 miles of Quartz Creek Roads are under Bonner County jurisdiction and will not be subject to the project. In addition to expanding two existing rock quarries, the proposed action would develop an additional rock quarry in the main project area and a new rock pit in the Binarch Creek area. The Binarch Pit would also be accessible from Highway 57. Table 2-1 presents the rock sources included in the proposed action. In addition to providing surfacing material, these rock sources would provide material for slope protection and subgrade stabilization rock (personal communication, Jackson 2004).

The road upgrade includes the creation of additional turnouts and at least one major and several minor realignments. Approximately 5 to 6 miles of the road involve easements through private land, with the remainder on National Forest System land. In most locations, the existing road is between approximately 12 and 16 feet wide; on private property the easement is either 33 feet or 66 feet. Reconstruction and maintenance activities to address road conditions include raising the grade in some locations, surfacing, drainage improvements, and the addition of turnouts. The road surface would be upgraded from no surfacing in most areas to crushed aggregate. In addition, under this alternative, the USFS would expand two existing rock quarries and develop a new rock quarry and a new rock pit. These sources are needed to provide rock for the upgraded road surface as well as potential future projects. The sources are identified in Table 2-1. These rock sources will be accessed from existing roads, with the exception of the proposed McAbee quarry, where a road no longer than 0.1 mile will be constructed from FSR-334 to the quarry location.

Table 2-1. Quartz-Cottonwood Road Project Rock Sources

Source Site/Size	*Location*	*Status/Activity*
1 – Peterson Road Quarry Expansion/ 5 acres	T 57 N, R 5 W, Section 24 Along Peterson Road	Expansion of existing quarry: ripping and blasting will produce riprap and coarse rock suitable for crushing; some stockpiling. Quarry may have some pit run available; production would not require ripping or blasting.
2 – Jasper Quarry Expansion/ 5 acres	T 58 N, R 5 W, Section 36 A forested knob with a level parking area on the north side running parallel with FSR 416	Expansion of existing quarry: ripping, blasting, crushing and/or screening; some stockpiling.
3 – Binarch Pit/20 acres	T 59 N, R 4 W, Section 7 T 59 N, R 5 W, Section 12 Just west of Highway 57, bordered on the north, west, and east sides by a plowed road cut, and on the south side by a line of mature trees	Development of new pit: ripping, blasting, crushing, stockpiling.
4 – North of McAbee Falls/ 5 acres	T 57 N, R 4 W, Section 18 Between south FSR 334 and an existing rock source	Development of new quarry: ripping, possibly blasting; stockpiling; construct 0.1 mile access road.

There are approximately 19 "live" creek or stream crossings where the culverts will be either upgraded or replaced. Existing pipes that are damaged or poorly placed may be replaced or moved, and culverts may be added throughout the road system. Additional ditch and/or spring relief culverts that drain the road will also be upgraded to appropriate diameters, or relocated as needed, reflecting the final road design and sediment control objectives of this project. Currently, 38 of these ditch/spring relief pipes have been identified, most of them measuring 12 inches in diameter.

The USFS will complete the engineering design work for the Quartz-Cottonwood Road Project following the environmental assessment, to incorporate specific road knowledge gained during the process into the final design, thus avoiding expensive and time-consuming redesign.

2.6 CUMULATIVE EFFECTS ANALYSIS

2.6.1 Reasonably Foreseeable Actions

Cumulative effects analysis must take into account the collective effect of the proposed project, when combined with other activities near the project area. Cumulative effects analysis areas can vary among resources, and are defined based on the level of effect experienced by each resource. The Priest Lake District of the IPNF proposes actions in the vicinity of the Quartz-Cottonwood Road Project, including forest restoration and fuels reduction. The Chips Ahoy EIS forest restoration project is proposed in T59N, R5W (Boise Meridian) and T35 & 34N, R45E

(Willamette Meridian, WA). The Notice of Intent was published June 6, 2003. The Priest Lake District has proposed Lakeface Lamb Categorical Exclusion for urban interface fuels reduction. The proposed project is located at T59N, R4 and 5W, T60N, R4 and 5W. Another fuels reduction project, the 57 Bear Paws Categorical Exclusion, is proposed by the Priest Lake District for T57N and T58N, R5W and R6W. Limited timber harvest is proposed by the Priest Lake District on the Gleason Pine project in T58N, R5W, S3 and 4, and T59W, R5W, S33 and 34 (IPNF 2004).

Ongoing, non-project activities can contribute to cumulative effects. Examples include general or personal gathering of fuelwood, routine road maintenance or special use permits (e.g., utilities, resort operations, access), recreation use, activities on private land, and fire suppression. Cumulative effects are discussed in detail commensurate with each resource analyzed in Chapter 3.0. Cumulative effects for each resource are briefly summarized in this section.

Hydrology. Detrimental effects from actions on private land, and short-term negative effects from fire suppression, road maintenance and road decommissioning will be offset by the overall positive effect of upgrading the roadbed and improving drainage. The Chips Ahoy Forest Restoration, 57 Bear Paws fuel reduction, and Lakeface Lamb urban interface fuels reduction occur in a different watershed, and should have no effect on the hydrology of the Quartz-Cottonwood Road Project area. To qualify for a categorical exclusion, the Gleason Pine Limited Timber Harvest has been designed to have no impact on resources.

Fisheries. Short-term, negative effects from road maintenance and fire suppression, and negative effects from possible actions on private land, will be offset by the improvement of water quality in the watershed and the management of fish passage through the streams within the project area.

Wildlife. With design characteristics incorporated into the Chips Ahoy forest restoration project, and because of the scope of this project and its expected low-level of impact based on project design and mitigation, the Quartz-Cottonwood project would not contribute to cumulative impacts to wildlife. Future brushing, blading, and plowing of open roads would not be likely to impact any wildlife habitat. Logging which may occur over private land that occurs within the Quartz and Cottonwood Creek drainages is not expected to significantly reduce suitable habitat. Projects with categorical exclusions or limited timber harvest are designed so as to have minimal impact, resulting in no cumulative effect to wildlife.

Vegetation. With design characteristics incorporated into the Chips Ahoy forest restoration, and because of the scope of this project and its expected low-level of impact based on project design and mitigation, the Quartz-Cottonwood project would not contribute to cumulative impacts to sensitive plant occurrences, or contribute to the proliferation of noxious or invasive species beyond the project area. Planned timber harvest activities on private lands are expected to continue to impact some suitable habitat, with the possibility that some rare plant occurrences may be lost. Ongoing road maintenance and noxious weed treatment are not expected to contribute to cumulative impacts nor are categorically excluded projects or those with design limitations.

Heritage Resources. With mitigation primarily through avoidance as a standard for USFS projects, the Chips Ahoy, 57 Bear Paws, Gleason Pine, and Lakeface Lamb projects will not have an effect on heritage resources. Non-project actions that may occur within the cumulative impact area, such as grazing, fire suppression, off road vehicle use, recreation and activities on private land, can all have a negative impact on heritage resources, but the Quartz-Cottonwood project will not add to effects from these activities. Road maintenance and road decommissioning are unlikely to have any effect on heritage resources.

2.7 COMPARISON OF EFFECTS BY ALTERNATIVE AND MITIGATION MEASURES

2.7.1 Mitigation Measures

Mitigation measures include:

- *Mitigation by Avoidance:* These mitigations use existing information or data collected as part of the EA to avoid siting alternatives and project components in areas or settings known to contain environmental or heritage resources that could be significantly affected.
- *Mitigation by Design:* These mitigations use project design, configuration, and/or component location to reduce or eliminate potential impacts to a resource or suite of resources.
- *Mitigation by Action:* These mitigations reflect a specific action taken to resolve issues and reduce the potential for impacts. Mitigations by action consist of processes not directly related to project design, and also include actions away from the project area such as consultation, habitat acquisition or land exchange.

Mitigation by avoidance, as implied by its name, requires that the project design reflect an active effort to not adversely impact resources. For example, the Quartz-Cottonwood Road project will avoid known heritage resources. The difference between mitigation by design and mitigation by action is that the latter may consist of programs outside of the area of potential effect (APE), projects not directly tied to the project, or projects with a broader scope than just the APE. Examples of mitigation by action include, but are not limited to: consultation; habitat development outside of the APE; and research and development of restoration plans. For each resource area, Table 2-2 presents potential effects of the Quartz-Cottonwood Road Project and mitigations for those effects.

2.7.1.1 PROJECT MONITORING

Should the proposed action be selected, monitoring would take two forms: monitoring to ensure that implementation of mitigation measures is consistent with established standards and guidelines; and monitoring to provide notification should an unanticipated impact arise.

Table 2-2. Proposed Mitigations
(Page 1 of 5)

Hydrology: Water quality and channel morphology	
Potential Effect Addressed	Sedimentation within project area. Erosion from the existing gravel roadbed.
Mitigation Type	Mitigation by avoidance; mitigation by design; mitigation by action
Mitigation	• Confine construction efforts to the later summer months when many of the ephemeral creeks are dry. • Place temporary diversion structures and/or impound stream flow to reduce the exposure of disturbed soil to flowing water during culvert replacement. • Complete re-vegetation on newly exposed cut slopes as soon as practicably possible after construction to minimize further erosion. • Minimize the steepness of the cut slopes to the extent practical (and in conjunction with Federal Highway Administration [FHWA] guidelines) to minimize the potential for erosion and sedimentation of the receiving streams. • Install silt fencing or erosion control vegetation mats to further isolate exposed soils. • Eliminate the practice of side casting excess graded material. • Every attempt should be made to minimize road width and promote vegetative cover on the shoulder and areas adjacent to the roadbed when roadway re-alignment brings the roadway close to an active stream, or in extreme cases install a slit fence below the roadbed. • Roads in close proximity to streams should be insloped if possible and ditch relief diverted away from the stream or into sufficiently large, vegetative energy dissipation areas. Road grades should vary over grade to reduce intensity of flow.
Mitigation Effectiveness	**High***:* These mitigation actions are commonly applied to road projects on forested lands in the Northwest. They have been proven to reduce potential impacts to water resources, sustain channel stability, and reduce hydraulic structure failure. They have a high probability of being implemented because they are incorporated into the project design.

Table 2-2. Proposed Mitigations
(Page 2 of 5)

Fisheries	
Potential Effect Addressed	Increase in suspended and bedload sediment. Reduction in riparian reserve areas.
Mitigation Type	Mitigation by avoidance; mitigation by design; mitigation by action
Mitigation	• Exclude road construction during spawning or migration. • Delineate Riparian Habitat Conservation Areas (RHCAs) along every waterbody within the project area. • Develop and implement a Storm Water Pollution Prevention Plan (SWPPP). • Locate staging areas, rock and gravel borrow sources, and waste material disposal sites associated with highway construction projects outside RHCAs and stream floodplains to avoid impacts to bull trout habitat. • Prepare and implement a blasting plan that includes provisions to avoid disturbances to bull trout. • Include a provision in road construction project contracts that allows construction activity to be halted if an adverse effect to bull trout is occurring. • Plant vegetation to assure bank stability and establishment of a well-developed riparian overstory. A re-vegetation plan will be prepared and made available to the Idaho Department of Fish and Game (IDFG). • Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood and its associated bedload and debris. • Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure. • Provide and maintain fish passage at all road crossings of existing and potential streams supporting bull trout or westslope cutthroat trout. • Prohibit storage of fuels and other toxicants and refueling within RHCAs. • Establish a designated refueling area for fuel, oil, and other hazardous materials outside of standard RCHAs, based on Inland Native Fish Strategy (INFISH) (1995). • Prepare and make available to Idaho Department of Environmental Quality (DEQ) a hazardous materials spill prevention/contingency plan. • Use BMPs to prevent suspended or bedland sediment from entering the floodplain channel.
Mitigation Effectiveness	**High:** INFISH RMOs developed by the USFS have proven to be highly effective. Therefore, they have a high probability of being implemented since they are incorporated into project design.

Table 2-2. Proposed Mitigations
(Page 3 of 5)

Wildlife: Bald Eagle	
Potential Effect Addressed	Impact to wildlife from noise and human presence during construction. Direct mortality during construction. Habitat alteration.
Mitigation Type	Mitigation by avoidance
Mitigation	• Surveys of known or potential bald eagle nests will be conducted annually. If an active nest is documented within the project area, road improvement operations and related activities would be suspended within 1 mile (1600 meters) of active nest sites between February 1 and July 15 to reduce risk of nest abandonment caused by disturbance. Activity restrictions could be removed if nests were determined to be inactive.
Mitigation Effectiveness	**High**: Avoidance of nesting sites is an effective method of preventing nesting disturbance. Use of BMPs during construction should also effectively mitigate possible effects. Cessation of activity during active nesting periods is also effective. When built into project design, these methods have a high probability of being implemented.
Wildlife: Canada Lynx	
Potential Effect Addressed	Impact to wildlife from noise and human presence during construction. Direct mortality during construction. Habitat alteration.
Mitigation Type	Mitigation by design
Mitigation	• Clearly mark boundaries of suitable lynx habitat adjacent to Binarch Pit to avoid incidental project-related activity in lynx habitat.
Mitigation Effectiveness	**High**: Avoidance of lynx habitat is an effective method of preventing disturbance. Use of BMPs during construction should also effectively mitigate possible effects. When built into project design, these methods have a high probability of being implemented.
Wildlife: Northern Goshawk	
Potential Effect Addressed	Impact to wildlife from noise and human presence during construction. Direct mortality during construction. Habitat alteration.
Mitigation Type	Mitigation by avoidance
Mitigation	• Establish a 30-acre no-activity buffer around the nest tree. For nest sites that lie outside treatment areas within a disturbance risk area, road improvement operations and related activities would be suspended within one-quarter mile (approximately 400 meters) of known nest sites during March 15 - August 15 to reduce risk of nest abandonment caused by disturbance. Activity restrictions can be removed after June 30 if nest site is determined to be inactive or unsuccessful.
Mitigation Effectiveness	**High**: Avoidance of nesting sites through the creation of a buffer zone is an effective method of preventing nesting disturbance. Use of BMPs during construction should also effectively mitigate possible effects. Cessation of activity during active nesting periods is also effective. When built into project design, these methods have a high probability of being implemented.

Table 2-2. Proposed Mitigations
(Page 4 of 5)

Vegetation	
Potential Effect Addressed	Incremental reduction in rare plant habitat and native communities in the region.
Mitigation Type	Mitigation by avoidance; Mitigation by design; mitigation by action
Mitigation	• Noxious weed treatments within 50 feet of documented sensitive plant species locations would be limited to manual or hand spray applications. • Surveys would be conducted in the immediate vicinity of the documented occurrence of *Rhizomnium nudum* to determine the distribution of the occurrence upslope and downslope of the documented location. If *Rhizomnium nudum* is limited to the area already documented, the road corridor would be realigned to the extent possible to avoid direct impacts to the occurrence. • Any changes to the selected alternative that may occur during layout would be reviewed, and threatened, endangered, and sensitive plant surveys conducted as necessary prior to project implementation. Newly documented rare plant occurrences would be evaluated, with specific protection measures implemented to protect population viability. Such measures could include modification of road improvement boundaries in areas with documented threatened, endangered, and sensitive plant populations to exclude documented occurrences from project activities. • Noxious weed treatment would be conducted according to guidelines and priorities established in the Priest Lake Weed Control Project Final EIS (USFS 1997). Methods of control may include biological, chemical, mechanical and cultural. • Gravel or borrow pits to be used during road construction or improvements would be free of new weed invader species (as defined by the IPNF Weed Specialist). • Any priority weed species (as defined by the IPNF Weed Specialist) identified during road maintenance would be reported to the District Weed Specialist. • Weed treatment of all haul routes, service landings, and turnouts would occur prior to ground disturbing activities where feasible. If the timing of ground disturbing activities would not allow weed treatment to occur when it would be most effective, it would occur in the next treatment season following the disturbance. • All newly constructed turnouts or other areas of disturbance (including maintenance on existing roads) would be seeded with a weed-free native and desired non-native seed mix and fertilized as necessary. All straw or hay used for mulching or watershed restoration activities would be certified weed-free.
Mitigation Effectiveness	**Medium to High***:* Although these methods are considered BMPs for forested regions of the Northwest and are known to be effective measures when included in project design, introduction of non-native and/or noxious weed species can occur through actions not controlled by the USFS, including activities on private land and actions by recreational users. **Low to Medium:** If the road corridor cannot be realigned to protect the documented occurrence of *Rhizomnium nudum*, this design measure would not protect the documented occurrence, and the project may have a negative effect on the local population.

Table 2-2. Proposed Mitigations
(Page 5 of 5)

Heritage Resources	
Potential Effect Addressed	Impact on heritage resources.
Mitigation Type	Mitigation by avoidance; mitigation by action
Mitigation	• Avoid the NRHP eligible site. • Develop an impact mitigation plan in consultation with the Idaho State Historic Preservation Office (SHPO). • Monitor areas with high potential for heritage resources during periods of construction in those areas. • Cease construction in the event of the discovery of an unanticipated archaeological resource. Notify the USFS immediately. In the event of the discovery of human remains, cease all construction activity and notify the USFS and requisite authorities immediately to determine requisite follow-up actions.
Mitigation Effectiveness	**High**: Avoidance during construction is an accepted and effective method of preventing impacts to heritage resources. Monitoring also has proved effective at identifying unanticipated discoveries during construction, provided there are procedures in place to address situations where stop-work orders may be necessary, followed by consultation. Special contract provisions are included in construction contracts, resulting in a high probability of implementation.

Hydrology. An IPNF construction engineer will oversee design and installation of road features intended to address hydrology mitigations. IPNF staff will continue to monitor road conditions and functionality of the drainage features over the life of the road. Regularly scheduled road maintenance and inspection will be necessary after construction.

Fisheries. To insure no adult migrating or spawning bull trout by a designated observer will conduct monitoring.

The United States Fish and Wildlife Service (USFWS) (1998) has revised the INFISH Riparian Management Objectives (RMOs), describing good habitat for resident and migratory bull trout, to develop a "Checklist for documenting environmental baseline and effects of proposed action(s) on relevant indicators" (Appendix A) for evaluating the effects of human activities on bull trout and its habitat.

Buffer widths for RHCAs in the project area would be monitored prior to and during the project to ensure that they are applied. During project activities, the contract administrator would do monitoring of RHCAs.

Wildlife: Surveys of known or potential bald eagle nests will be conducted annually. If road improvement construction occurs in more than one year, historic or active goshawk nest sites would be surveyed each year prior to initiation of construction.

Vegetation. Any changes to the selected alternative that may occur during design layout would be reviewed, and threatened, endangered, and sensitive plant surveys conducted as necessary prior to project implementation. Newly documented rare plant occurrences would be evaluated, with specific protection measures implemented to protect population viability.

Monitoring of sensitive plant populations where the proposed activity was modified by buffering to avoid adverse effects would be conducted by a botanist to validate the effectiveness of mitigation measures during and following the activity.

The effectiveness of seeding disturbed areas would be evaluated by the USFS upon completion of the activity. Treated areas would be surveyed and monitored according to treatment priorities established in the Priest Lake Noxious Weed Control Project Final EIS.

Any priority weed species (as defined by the IPNF Weed Specialist) identified during road maintenance would be reported to the District Weed Specialist.

Heritage Resources. Areas with a higher probability for the presence of sensitive heritage resources will be monitored by the USFS during construction.

2.7.2 Comparison of Effects

For all resources, pursuing the no action alternative would result in the roads and culverts remaining in their current unimproved status. Table 2-3 presents a comparison of potential effect by alternative. Selection of the no action alternative would continue adverse effects to the fisheries and hydrology of the project area as some culverts are inadequate for the conditions, and the roads would continue to erode in some areas. Wildlife, botany, and heritage resources would remain unaffected.

Table 2-3. Comparison of Potential Effects by Alternative

Resource	*Alternative 1: No Action*	*Alternative 2: Proposed Action*
Hydrology	No change from baseline. Roads and culverts would remain in current unimproved status.	Temporary increases in sedimentation and turbidity from construction-related ground disturbance. Long-term reduction in sediment loads and improvements to alleviate localized flooding and saturated conditions.
Fisheries	No change from baseline. Roads and culverts would remain in current unimproved status.	Temporary increases in turbidity from construction. Long-term improvement by removing barriers to upstream movement of some fish species.
Wildlife	No change from baseline.	Temporary impacts including noise and human presence during construction. Small habitat loss in new rock source areas. Noise and dust associated with rock-producing activities.
Botany	No change from baseline.	Ground disturbance and loss of potential rare plant habitat during construction. Small habitat loss in new rock source areas.
Heritage Resources	No change from baseline.	Ground disturbance could affect a known National Register of Historic Places (NRHP)-eligible site, although monitoring during construction in the area of this resource would ensure there is no adverse impact.

Although Alternative 2 could produce short-term, temporary effects, over-all effects upon completion of the project should be beneficial. Road improvements could introduce sediment into streams but upon completion of the properly designed live stream crossings and improved ditch relief culverts, sediment load would be reduced and fish species would have better passage. Similarly, the improved road surface and design would reduce erosion, eliminating another source of sediment to waterways.

For vegetation and wildlife resources, effects can be avoided by using BMPs during construction, and avoiding sensitive areas. Weed prevention would be conducted using guidelines and priorities established by the EIS for Noxious Weed Control, Priest Lake Ranger District (USFS 1997). Short-term disturbance during construction and minimal loss of habitat from development of rock sources would be counterbalanced by the stabilization of roads and reduced erosion. The same holds true for heritage resources, where one known location would need to be avoided to prevent adverse effects.

CHAPTER 3.0 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

This chapter presents information on environmental conditions for resources potentially affected by the proposed action and no action alternative described in Chapter 2.0. Under NEPA, the analysis of environmental conditions should address only those areas and environmental resources with the potential to be affected by the proposed action or alternatives; locations and resources with no potential to be affected need not be analyzed. This chapter also presents an assessment of the potential environmental consequences of implementing the proposed action or no action alternative. Mitigation measures (also summarized in section 2.7) are included in this chapter with the analysis of potential consequences. Cumulative effects, summarized in section 2.6, are presented in more detail at the conclusion of each Chapter 3.0 section.

3.1 HYDROLOGY

3.1.1 Definition of Resource

The proposed project area is entirely contained within the Lower Priest River watershed. It includes the basins draining into Cottonwood Creek, Quartz Creek, and Murray Creek and is bounded on the east by the Priest River from approximately RM 13.8 to RM 22. Specific attributes of the hydrologic resource that are addressed in this EA include hydrology, water quality, channel morphology, erosion, and mass wasting.

3.1.2 Existing Conditions

3.1.2.1 CLIMATE

The climate is transitional between a northern Pacific coastal type and a continental type. Annual precipitation averages 32 inches at the weather station located within the USFS Priest Lake Experimental Forest, about 15 miles north of the city of Priest River, and directly east of the project area. At elevations above 4,800 feet, snowfall accounts for more than 50 percent of total precipitation. The elevation zone between 2,000 feet and approximately 3,500 feet is subject to rapid snowmelt from warm and moist mid to late-winter rainstorms. Mean monthly temperatures range from 25 degrees Fahrenheit (^{o}F) in January to 64^{o}F in July, as measured at the town of Priest River (State of Idaho 2003).

3.1.2.2 PRIEST RIVER BASIN AND SUBBASINS

The Priest River Basin (Hydrologic Unit #17010215), located in the northwest corner of the Idaho Panhandle, covers 981 square miles in Bonner and Boundary counties of Idaho, Pend Oreille County in Washington, and a portion of British Columbia, Canada. Headwaters of the Priest River originate in the Nelson Mountain Range, British Columbia, and the basin is bordered by the Selkirk Mountains on the east and the Kaniksu and Colville National Forests to the west. Elevations in the basin range from 2,075 feet at Priest River, Idaho to over 7,080 feet in the Wigwams, Selkirk Mountains. The Priest River generally flows north to south, with streams on the west side having an east aspect and most flow through low gradient Rosgen C, D, E, and F channels.

The Lower Priest River watershed, a subbasin of the Priest River Basin, is defined by the area draining into the Priest River from the Priest Lake outlet to the confluence with the Pend Oreille River, 45.5 RM south excluding the area draining into the Priest River upstream of the Priest Lake outlet. Most of the Lower Priest River watershed burned in fires that occurred from 1925 to 1939 (State of Idaho 2003). Historic log drives down the Priest River are believed to have caused considerable damage to the stream banks resulting in stream bank slippage and mass failures that can still be observed along the river course today.

Contained within the Lower Priest River watershed and the project area are several smaller subbasins, including Cottonwood Creek, Murray Creek, and Quartz Creek watersheds. Elevations within the project area range from 3,873 feet at Jasper Mountain to 2,180 feet along the Priest River upstream of McAbee Falls.

3.1.2.3 STREAM CHANNELS

LOWER PRIEST RIVER

The Lower Priest River originates at the outlet of Priest Lake and flows south to the confluence with Pend Oreille River. This section of the Priest River drains 219,980 acres and has mean average daily flows ranging from 5,000 cubic feet per second (cfs) in May to 200 cfs from late July to October. The maximum recorded flow of 10,700 cfs occurred in May 1997 and a minimum recorded flow of 150 cfs occurred in November 1979 (State of Idaho 2003).

Approximately 7.2 miles of the Priest River upstream of McAbee Falls are included in the proposed project area. FSR 334 closely parallels the Lower Priest River at six sites, totaling about one mile in river length.

Within the project area, approximately 34 RM of the Priest River are listed as being impaired by the Idaho DEQ under section 303(d) of the Clean Water Act. This segment of the Priest River is listed as impaired for sediment. Sediment Total Maximum Daily Loads (TMDLs) have been approved for Lower West Branch and East River, which are tributaries of the lower Priest River.

QUARTZ CREEK

Quartz Creek is about 6.5 miles in length and drains an area of approximately 7,200 acres. The mean annual flow in Quartz Creek is approximately 23 cfs (Hortness and Berenbrock 2001). The upper 5.5-mile portion of Quartz Creek is Rosgen type "E" channel and the lower 1-mile is type "B" (USFS 2000). The Quartz Creek watershed was determined to be functioning at risk, with a watershed and riparian road density of about 5.0 miles/square miles, a moderately-stable trending toward unstable channel, and low sediment delivery (USFS 1999).

Quartz Creek is not listed as impaired and there are no TMDLs for Quartz Creek, Cottonwood Creek, or any surveyed tributaries (personal communication, Rothrock 2004).

COTTONWOOD, MURRAY, AND STEEP CREEKS

Upstream of the FSR 334, Cottonwood Creek drains approximately 1,600 acres and is about 2.1 miles long. Upstream of FSR 334, Murray Creek drains approximately 1,900 acres and is about 3.1 miles in length. Steep Creek is approximately 1.8 miles in length and drains 550 acres upstream of FSR 416. These creeks are mixtures of Rosgen B, C, and mostly E channels. Cottonwood and Murray creeks both flow into an isolated oxbow lake in the Lower Priest River floodplain around RM 24.

UNNAMED TRIBUTARIES

Thirteen unnamed tributaries crossing the project roads were identified from United States Geological Survey (USGS) 7.5-minute quadrangle maps and the National Hydrography Dataset and were verified in the field. The drainage areas for these tributaries range from 63 acres (Tributary 11) to 494 acres (Tributary 5). Six of the tributaries flow into the Priest River, four flow into Quartz Creek, and three flow into Cottonwood Creek. Figure 3-1 depicts the project area within the context of the Lower Priest River and the tributaries described above. Table 3-1 summarizes the stream channel drainage areas and flood flow event calculations.

3.1.2.4 STREAM CROSSINGS

There are 19 locations where the project roads cross-identified streams (Figure 3-1). Sixteen of these crossings are through culverts constructed of corrugated metal pipe ranging in size from 12 inches to 6 feet. The crossing of FSR 416 over Quartz Creek, upstream from Steep Creek, utilizes a bridge. Two small intermittent streams flow overland across the road. The culverts' geometry, location, and description are shown in Table 3-2.

QUARTZ CREEK

The Quartz Mountain Road (FSR 416) crosses Quartz Creek in two places and parallels Quartz Creek for about 0.4 miles in Section 36 of T 58 N, R5W. The upstream culvert (Stream Crossing #16) located at the intersection of FSR 416 and FSR 239 is a 72-inch culvert on the stream grade and is about 40 percent filled with sediment.

A 14-foot long, single lane bridge is located on Quartz Creek upstream of Steep Creek (Stream Crossing #15). Quartz Creek crosses FSR 334 near the intersection of FSR 416 (Stream Crossing #3) through another 72-inch culvert and 48-inch overflow culvert. Pools have formed above and below the 72-inch culvert due to stream channel erosion but the stream banks appear to be stable.

COTTONWOOD, MURRAY, AND STEEP CREEK

Cottonwood Creek crosses FSR 334 through a 30-inch culvert and drops 10 inches at the culvert outlet into a plunge pool. Murray Creek flows through a 48-inch culvert at FSR 334. Road fill erosion has occurred at the culvert inlet leaving a 3-inch rise from the channel invert to the culvert inlet. Steep Creek crosses FSR 416 through a 24-inch culvert that is about 75 percent filled with sediment and obstructed at the inlet by a fallen tree. Severe stream bank erosion has occurred upstream of the culvert.

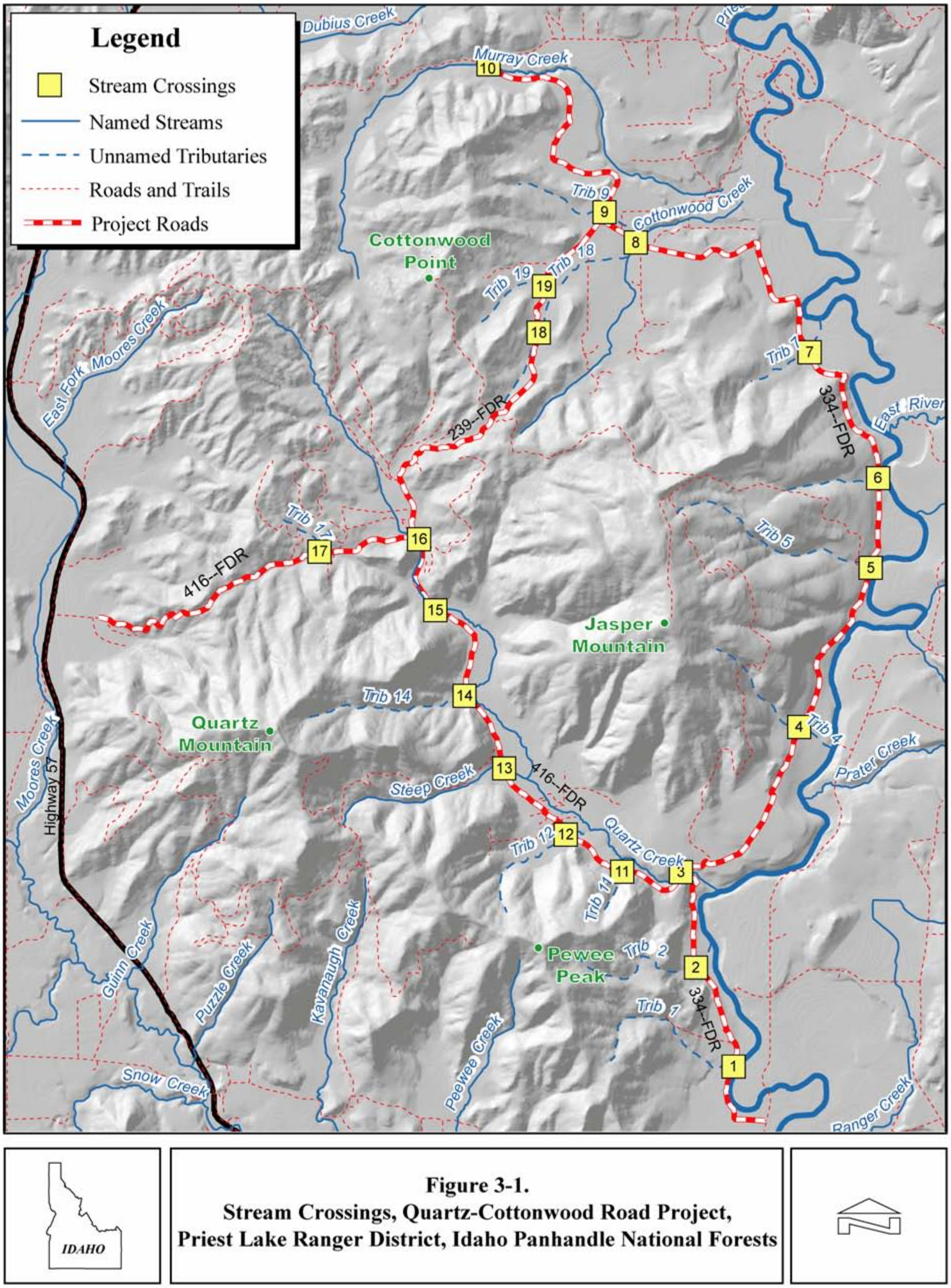


Figure 3-1.
Stream Crossings, Quartz-Cottonwood Road Project,
Priest Lake Ranger District, Idaho Panhandle National Forests

Table 3-1. Stream Channels

Stream Name	*Stream Crossing*[1] *(Culvert ID)*	*Drainage Area*[2] *(mi^2)*	*Q_2*[3] *(cfs)*	*Q_{50}*[4] *(cfs)*	*Q_{100}*[5] *(cfs)*
Quartz	16	2.7	42.3	106.1	119.5
Quartz	15	4.4	64.6	159.1	179.2
Quartz	3	11.2	138.7	332.0	374.3
Cottonwood	8	2.6	39.4	99.7	112.4
Murray	10	3.0	64.3	109.6	123.6
Steep	13	0.85	23.4	40.6	45.8
Tributary 1	1	0.62	15.9	40.1	44.1
Tributary 2	2	0.31	8.7	21.9	24.1
Tributary 4	4	0.29	8.2	20.7	22.8
Tributary 5	5	0.77	19.4	48.9	53.8
Tributary 6	6	0.43	11.6	29.3	32.2
Tributary 7	7	0.20	5.8	14.6	16.1
Tributary 9	9	0.36	10.0	25.2	27.7
Tributary 11	11	0.10	3.2	8.0	8.8
Tributary 12	12	0.70	17.9	44.9	49.4
Tributary 14	14	0.49	13.0	32.9	36.1
Tributary 17	17	0.18	5.4	13.6	15.0
Tributary 18	18	0.26	7.5	19.0	20.9
Tributary 19	19	0.31	8.6	21.7	23.9

Notes:
1. "Stream Crossing" refers to the point along the stream channel for which the drainage area and flood flows are calculated.
2. The drainage area for the portion of the stream upstream of the culvert inlet.
3. Q_2 is the stream flow event for the 2-year average recurrence interval (i.e., this flow could be expected to occur once every 2 years).
4. Q_{50} is the stream flow event for the 50-year average recurrence interval (i.e., this flow could be expected to occur once every 50 years).
5. Q_{100} is the stream flow event for the 100-year average recurrence interval.

Table 3-2. Stream Crossing Descriptions

Stream Name/Label	*Stream Crossing (Culvert ID)*	*Culvert Size (inches)*	*Culvert Gradient*	*Observed Stream Crossing Condition*
Tributary 1	1	24	0.5%	Appears to be properly functioning culvert at low flow
Tributary 2	2	16	1.0%	Appears to be properly functioning culvert at low flow
Quartz	3	72 & 48	7.0%	Appears to be properly functioning double culvert at low flow
Tributary 4	4	18	1.0%	Appears to be properly functioning culvert at low flow
Tributary 5	5	36	2.0%	Road fill erosion around culvert inlet
Tributary 6	6	30	6.0%	Induced stream channel migration due to culvert not in-line with channel
Tributary 7	7	18	5.0%	2 foot drop at culvert outlet
Cottonwood	8	30	0.5%	10 inch drop at culvert outlet
Tributary 9	9	none	n/a	No culvert present; shallow channel has formed across roadway to convey flow
Murray	10	48	0.5%	Appears to be properly functioning culvert at low flow
Tributary 11	11	12	4.0%	Appears to be properly functioning culvert at low flow
Tributary 12	12	18	4.0%	Appears to be properly functioning culvert at low flow
Steep	13	24	3.0%	Culvert is ¾ filled with sediment and inlet is obstructed by Alder root system
Tributary 14	14	24	6.0%	8-inch drop at outlet
Quartz	15	Bridge (68 x 48)	0.5%	Bridge opening appears to function properly at low flow
Quartz	16	72	0.5%	Culvert 40 percent filled with sediment
Tributary 17	17	12	4.0%	Appears to be properly functioning culvert at low flow
Tributary 18	18	18	1.0%	Appears to be properly functioning culvert at low flow
Tributary 19	19	none	n/a	Culvert wrapped around tree

Note: 1. See Table 3-3 for culvert replacement recommendations.

UNNAMED TRIBUTARIES

Eleven of the tributaries cross the project roads through culverts ranging in diameter from 12 inches to 36 inches. Two of the tributaries (Tributaries 19 and 9) flow overland across the project roads. The culvert for Tributary 19 appears to be folded around a tree beside the road although no distinct stream channel was identified during field observation. A shallow channel has formed across the road at Tributary 9 and a culvert was not found. Additional stream crossing information for the tributaries is summarized in Table 3.1.2.

LOWER PRIEST RIVER

FSR 334 closely parallels the Priest River at six locations, totaling about one mile in river length. The road encroaches upon the Priest River for approximately 1,000 feet upstream of McAbee Falls. Stream bank failure along this section has been associated with the FSR 334 fill slopes (State of Idaho 2003).

3.1.2.5 DITCH RELIEF CULVERTS

In addition to the 19 stream crossings described above, 38 ditch/spring relief pipes have been identified within the project area that are used to convey flow from small drainages and springs. These culverts are mostly 12-inch corrugated metal or polyvinyl chloride (PVC) pipes used to convey small drainages and roadway runoff. These culverts do not appear to be causing erosion or any significant degradation to hydrologic functionality within the study area.

3.1.3 Environmental Consequences

3.1.3.1 SIGNIFICANCE CRITERIA

This section evaluates the potential for impacts to water resources under the proposed and no action alternative. Determination of the significance of potential impacts to water resources is based on compliance with the Clean Water Act and its amendments, and Idaho State's implementations of the Clean Water Act (IDAPA 58.01.02). Impacts to water resources would therefore be considered significant if they resulted in a violation of the Clean Water Act as identified through numeric and narrative criteria as set forth in IDAPA 58.01.02. The primary pollutant of concern associated with this project is sediment, as the Lower Priest River is currently 303(d) listed for sediment. Measurable effects associated with the proposed action include either a net increase or a net reduction in sediment delivery to the Priest River and its tributaries. Numerical significance criteria for sediment mandates that turbidity shall not exceed background by more than 50 Nephelometric Turbidity Units (NTU) instantaneous or more than 25 NTU for more than 10 consecutive days. Narrative significance criteria for sediment (IDAPA 58.01.02.200.08) states that sediment shall not impair designated beneficial uses. Designated beneficial uses for the Lower Priest River include aquatic life, water supply, recreation, wildlife habitats, and aesthetics.

3.1.3.2 POTENTIAL IMPACTS AND MITIGATION

ALTERNATIVE 1: NO ACTION

Under the no action alternative, no road maintenance and no road improvements would occur. Most notably, culverts would not be evaluated nor modified to reduce sediment delivery. Roads would continue to flood in areas where culverts are currently undersized resulting in poor road conditions, road deterioration, and detrimental hydrologic impacts. Excessive sediment delivery to local streams resulting from flooded roadbeds contributes to continual stream channel degradation, stream bank instability, and channel morphology alterations.

ALTERNATIVE 2: PROPOSED ACTION

Under Alternative 2, 22 miles of single lane, gravel road will be upgraded to include the creation of additional turnouts and one major and several minor realignments. In conjunction with the roadway upgrade, stream crossing culverts will be upgraded to allow the passage of the 100-year flow event. This is expected to reduce sediment delivery to Priest River by several mechanisms. Replacing undersized and misaligned culverts may reduce channel scour and streambank erosion by reducing culvert-induced channel scour. Upgrading undersized culverts will reduce the potential for mass wasting of the roadbed resulting from culvert failure. Upgrading culverts may also reduce severe road surface erosion noticeable during spring snowmelt when roads within the project area become a muddy quagmire caused by local flooding. Additionally, ditch relief culverts that drain the road will be upgraded or replaced if they are found to be damaged, undersized, or improperly installed or located. Also associated with Alternative 2 is the expansion of two rock quarries and the creation of two new rock sources (four rock sources in total).

WATER QUALITY AND CHANNEL MORPHOLOGY IMPACTS AND MITIGATION

Implementation of the proposed action will require the use of heavy equipment to construct roadway realignments, additional roadway turnouts, and to replace existing culverts as necessary. These construction efforts have the potential to temporarily increase sedimentation and turbidity within the Lower Priest River watershed and associated receiving streams. Because of this, IPNF will prepare an SWPPP prior to commencement of construction. The SWPPP will identify the BMPs (e.g., hay bales, silt fences, catch basins) to be used to control erosion and sedimentation, reduce short-term impacts, and comply with water quality standards identified in IDAPA 58.01.02. All actions will be consistent with the IPNF Forest Plan, the Clean Water Act, and State Water Quality regulations. Significant impacts to water quality are therefore not expected.

Impacts associated with the construction and expansion of gravel sources are expected to be insignificant. Even though the existing gravel sources are poorly vegetated and susceptible to erosion, the gravel sources themselves will be hydrologically isolated from the receiving streams within the Lower Priest River watershed because runoff will simply flow into the quarries or pits. Grading of the proposed rock sources will be directed internally toward the sources to prevent runoff and sediment delivery to receiving streams. Also, BMPs (e.g., construction during low-flow periods, silt fence) will be implemented as needed to minimize potential impacts identified prior to any pit construction or expansion.

With the exception of potential short term sedimentation and turbidity impacts associated with the construction of the new roadway alignment, culvert replacements, and associated turnouts, the overall impact of the project may result in a net reduction of sediment delivery to Quartz Creek and ultimately to the Priest River due in large part to the proposed culvert replacements. Undersized and/or misaligned culverts have led to sediment aggradation (deposition), debris jams, and/or channel realignment, and in extreme cases complete culvert failure is possible. The installation of culverts capable of passing the 100-year flow event is expected to reduce the scouring of the channel bottoms that are tributary to the Priest River, thereby reducing the overall sediment load of the river and supporting the aquatic life beneficial use designation for the Lower Priest River. The installation of larger culverts will also help to alleviate localized flooding along roadway embankments and may also help to alleviate the saturated conditions that occur in the winter/spring months after rain-on-snow events produce peak flow events, localized flooding, and roadway overtopping.

Within the project area, there are 19 live stream crossing culverts that drain tributaries of Priest River and approximately 38 12-inch ditch relief culverts that drain the road prism itself. Consistent with USFS guidelines, the existing 12-inch ditch relief culverts will be upgraded to a minimum size of 18 inches to allow for positive drainage of the road prism. The 19 live stream crossing culverts were assessed to determine whether or not they could pass the 100-yr flow events. Existing culverts with insufficient capacity are identified in Table 3-3 and recommendations for sizing upgrades are provided. The USFS may also replace additional culverts and/or ditch relief culverts that are found to be damaged, improperly installed, or improperly located. Additional information on the detailed culvert capacity analysis can be found in the Hydrology Specialist Report (Science Applications International Corporation [SAIC] 2004).

Within the project area, the Priest River channel bank is encroached upon by FSR 334 upstream from McAbee Falls near RM 14 and is susceptible to mass wasting. This 1,000-foot section will be stabilized with a vegetated grid structure or other appropriate BMP to reduce sediment delivery from the unstable stream bank to the Priest River.

Culvert inlets will be armored to prevent the stream from eroding or undercutting the pipe. Additionally, the stream channel below the outlet will be armored, in order to dissipate energy. Culverts will be designed to facilitate fish passage: in other words, if culverts are excessively long or steep, the energy of the focused streamflow may inhibit fish passage. Also, a culvert (particularly a larger diameter culvert) that is too short will have a steep lateral fill slope on the culvert approach; often times these areas will be too steep for the establishment of vegetation and will become a chronic sediment source and location for noxious weed establishment. This problem is exacerbated if the culvert is located downhill of a steep road grade.

IPNF will perform regular scheduled road maintenance and culvert inspection. Road maintenance frequency will be increased for the first five years following the roadway construction. During and immediately after construction, increased sediment quantities are

Table 3-3. Characteristics of Stream Crossing Culverts and Replacement Recommendations (Page 1 of 2)

Culvert ID	*Stream Name*	*Drainage Area (mi^2)*	*100-Yr Flow (cfs)*	*Slope (ft/ft)*	*Existing Culvert Size (in)*	*Capable of Passing 100-yr Flow (Yes/No)*	*Recommended Replacement Culvert Size (in)[1]*	*Benefit*
1	Tributary 1	0.62	44.1	0.005	24	No	33	Reduced sediment load during high flows
2	Tributary 2	0.31	24.1	0.01	16	No	24	Reduced sediment load during high flows
3	Quartz	11.2	374.3	0.07	72&48	Yes	--	--
4	Tributary 4	0.29	22.8	0.01	18	No	24	Reduced sediment load during high flows
5	Tributary 5	0.77	53.8	0.02	37	Yes	--	--
6	Tributary 6	0.43	32.2	0.06	30	Yes	--	--
7	Tributary 7	0.2	16.1	0.05	18	No	21	Reduced sediment load during high flows
8	Cottonwood	2.56	112.4	0.005	30	No	48	Reduced sediment load during high flows
9	Tributary 9	0.36	27.7	0.005	none	No	27	Reduced sediment load during high flows
10	Murray	3	123.6	0.005	48	No	54	Reduced sediment load during high flows
11	Tributary 11	0.1	8.8	0.04	12	No	15	Reduced sediment load during high flows
12	Tributary 12	0.7	49.4	0.04	18	No	33	Reduced sediment load during high flows

Table 3-3. Characteristics of Stream Crossing Culverts and Replacement Recommendations (Page 2 of 2)

Culvert ID	*Stream Name*	*Drainage Area (mi^2)*	*100-Yr Flow (cfs)*	*Slope (ft/ft)*	*Existing Culvert Size (in)*	*Capable of Passing 100-yr Flow (Yes/No)*	*Recommended Replacement Culvert Size (in)[1]*	*Benefit*
13	Steep	0.85	58.7	0.03	24	No	36	Reduced sediment load during high flows
14	Tributary 14	0.49	36.1	0.06	24	No	30	Reduced sediment load during high flows
15	Quartz	4.38	179.2	0.005	68" x 48" bridge	Yes	Bridge is adequately sized but may require maintenance to protect against obstructions	--
16	Quartz	2.67	119.5	0.005	72[1]	Yes	--	--
17	Tributary 17	0.18	15	0.04	12	No	21	Reduced sediment load during high flows
18	Tributary 18	0.26	20.9	0.01	18	No	24	Reduced sediment load during high flows
19	Tributary 19	0.31	23.9	0.005	none	No	24	Reduced sediment load during high flows

Note: 1. Replacement culvert size calculated using FHWA methodology.
Source: Normann et al. 2001.

produced which fill ditches, culverts, and ditch relief structures. It is critical that these structures are properly functioning and can accommodate increased run-off and sediment quantities.

The proposed roadway realignments will be designed to prevent stream channelization which often straightens the stream channel to accommodate the roadbed. This in turn reduces channel length and can lead to channel incisement, a lowered water table, and the loss of riparian vegetation. Rip-rap is typically associated with channelization and prevents lateral stream movement and the maintenance of dynamic equilibrium.

To mitigate against potential impacts to water quality and channel morphology, the following roadway design BMPs will be implemented during construction, in addition to the other site-specific BMPs to be implemented as part of the SWPPP:

- Confine construction efforts to the later summer months when many of the ephemeral creeks are dry. This time period will also coincide with periods of low-flow for the perennial streams within the project area.
- Place temporary diversion structures and/or impound stream flow to reduce the exposure of disturbed soil to flowing water during culvert replacement.
- Newly exposed cut slopes will be re-vegetated as soon as practicably possible after construction to minimize further erosion. The steepness of the cut slopes will also be minimized to the extent practical (and in conjunction with FHWA guidelines) to minimize the potential for erosion and sedimentation of the receiving streams.
- Install silt fencing or erosion control vegetation mats to further isolate exposed soils.
- Every effort should be taken to reduce and mitigate sediment delivery both during construction and after it is complete. This includes elimination of the practice of side casting excess graded material. This material should be feathered back into the roadbed or hauled off site.
- In instances where the roadway re-alignment will bring the roadway close to an active stream, roadway width will be minimized and the proposed design will promote vegetative cover on the shoulder and areas adjacent to the roadbed, or in extreme cases install a silt fence below the roadbed.
- Roads in close proximity to streams will be insloped if possible and ditch relief diverted away from the stream or into sufficiently large, vegetative energy dissipation areas. Road grades should vary over in grade to reduce intensity of flow.

Despite the significant improvements associated with planned culvert replacements, a significant source of sedimentation within the project area remains as surface and cut bank erosion from the existing roadbed. Several isolated sites along FSR 416 and FSR 334 would benefit from cut bank stabilization and have been identified in the Hydrology Specialist Report (SAIC 2004). Soil bioengineering techniques such as live staking, brush layering, or installing vegetated grid structures may reduce erosion from these sites.

3.1.4 Cumulative Effects

The cumulative effects analysis area is defined as the Quartz Creek, Cottonwood Creek, and Murray Creek drainages. This analysis includes effects from past, present, and reasonably foreseeable future activities including fire suppression, off road vehicle use, road maintenance, activities on private lands, road decommissioning, livestock grazing, and recreational trails.

Fire suppression, road maintenance, and road decommissioning may contribute to short-term increases in sediment delivery to local streams causing increased turbidity. These activities can be expected to cause negligible effects lasting for several hours without any significant impact on water resources or overall sediment delivery. Road maintenance activities (i.e., blading, brushing, and culvert cleaning) typically improve drainage and decrease long-term erosion caused from road surface runoff and stream channel degradation. Short-term effects resulting from routine road maintenance can be minimized or eliminated by implementing standard BMPs such as confining maintenance to late summer months when many of the ephemeral creeks are dry. Road decommissioning may contribute sediment during construction activities although implementing standard BMPs may minimize this. The long-term effect of road decommissioning may be a significant reduction in erosion as a result of re-contouring and re-vegetating roadbeds.

Activities on private lands (e.g., riparian clearing and heavy machinery use) can have significant detrimental effects to water resources by causing channel instability and altering channel morphology. Livestock grazing and recreational trails affect channel morphology in localized areas (e.g., locations where trails cross streams or livestock access the stream) causing increased sedimentation into local streams; however, the effect is minimal on a watershed scale.

The cumulative effect of these activities can be partially offset with the proposed action of upgrading the roadbed and replacing undersized/insufficient culverts. An overall net decrease in sediment yield and improved channel morphology is anticipated.

3.2 FISHERIES

3.2.1 Definition of Resource

The Priest River Basin (Hydrologic Unit #17010215), located in the northwest corner of the Idaho Panhandle, covers 981 square miles in Bonner and Boundary counties of Idaho, Pend Oreille County in Washington, and British Columbia, Canada. Headwaters of the Priest River originate in the Nelson Mountain Range, British Columbia, and the basin is bordered by the Selkirk Mountains on the east and the Kaniksu and Colville National Forests in the west. Elevations in the basin range from 2,075 feet at Priest River, Idaho to over 7,080 feet in The Wigwams, Selkirk Mountains. The basin has four major areas: 1) Upper Priest River and tributaries; 2) Upper Priest Lake and tributaries; 3) Priest Lake and tributaries; and 4) Lower Priest River, from the outflow of Priest Lake to the confluence with the Pend Oreille River. The Priest River generally flows north to south, with streams on the west side having an east aspect and most flow through low gradient Rosgen (1985) C, F, D, and E channels.

Four indigenous salmonids occur in the Priest River basin: bull trout (*Salvelinus confluentis*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), mountain whitefish (*Prosopium williamsoni*), and pygmy whitefish (*P. coulteri*). Other native fish found in the basin area are: northern pike minnow (*Ptycheilus oregonensis*), largescale sucker (*Catostomus macrocheilus*), longnose sucker (*C. catostomus*), slimy sculpin (*Cottus cognatus*), shorthead sculpin (*C. confuses*), torrent sculpin (*C. rhotheus*), longnose dace (*Rhinichthys cataractae*), speckled dace (*R. osculus*), peamouth chub (*Mylocheilus caurinus*), and redside shiner (*Richardsonius balteatus*). Introduced species in the basin include: lake trout (*S. namaycush*), brown trout (*S. trutta*), brook trout (*S. fontinalis*), and rainbow trout (*O. mykiss*).

The Priest River basin is part of the Clark Fork River Recovery Unit, the Priest Lake Subunit, and the Lake Pend Oreille Core Area. The Clark Fork River Recovery Unit is the largest of all bull trout units, consisting of 22 units (including Flathead Lake and its tributaries) upstream from Albeni Falls on the Pend Oreille River (USFWS 2002).

3.2.1.1 LISTED AND SENSITIVE FISH SPECIES

BULL TROUT

Distribution

The historic range of bull trout was restricted to North America (Haas and McPhail 1991). Bull trout were historically found in many major river systems, but spawning and rearing was believed to be restricted to cold and relatively pristine headwater basins. Headwaters of most basins still support bull trout populations (Lee and others 1997). Bull trout have been recorded from the McCloud River in northern California, the Klamath Basin in Oregon and throughout much of interior Oregon, Washington, Idaho, western Montana, and British Columbia. Presently, the largest contiguous areas supporting bull trout populations are associated with the mountains of north central Idaho and northwestern Montana (Lee and others 1997). In Montana, bull trout occur in drainages of the Clark Fork, Flathead, Swan, and Kootenai River.

The Priest River Subbasin Assessment (State of Idaho 2001) states that "in the Priest River basin, excess sediment and channel disequilibrium has been linked to: historic large fires, logging practices and initial construction of a transportation network to bring timber to market; current timber activities and the existing road network; agricultural practices such as wet meadow draining through cross ditches, channel straightening, and livestock access to streams; urbanization with clearing and excavation in riparian areas and construction of substandard private roads; and lack of maintenance." These changes have had major impacts on riparian and aquatic habitat and bull trout. Also, the introduction of brook trout in streams and lake trout in Priest and Upper Priest lakes has suppressed bull trout populations.

Of the four indigenous salmonids in the Priest River Subbasin (westslope cutthroat trout, bull trout, mountain whitefish, and pygmy whitefish), the bull trout was listed as threatened under ESA in 1998; the westslope cutthroat trout is considered a Species of Special Concern by the State of Idaho; and the westslope cutthroat trout and torrent sculpin are listed as "sensitive species" by Region 1 of the USFS. Bull and westslope cutthroat trout have stream resident and migratory (adfluvial residing in lakes and fluvial residing in rivers) populations, and all life history forms were historically abundant in the Priest River Subbasin (Bjornn 1957). The decline in these species has been attributed to several factors, including a century of habitat degradation and competition with brook and lake trout. IDFG (2001) believes the presence of brook trout and reduction of bull and westslope cutthroat trout indicates that water quality has declined.

Life History Characteristics

Bull trout have three distinct life forms: resident, migratory river (fluvial), and migratory lake (adfluvial). Resident populations spend their entire life in small headwater streams. Migratory populations rear in tributary streams for several years before migrating into larger river systems, lakes and reservoirs where they live several more years, growing to much larger sizes than resident forms, before returning to tributaries to spawn. Bull trout generally mature between 5 and 7 years and may spawn every year or in alternate years (Pratt 1985). General life stage occurrences of bull trout in northern Idaho are shown in Table 3-4.

Table 3-4. Life Stage Occurrences of Bull Trout

Life Stage	*Time of Year*
Adult Migration	June – August
Adult Spawning	Late August – Early November
Incubation/Emergence	April – May
Summer Juvenile Rearing	May – October
Winter Juvenile Rearing	October – June
Juvenile Outmigration	June – August

Habitat Relationships

Bull trout have more specific habitat requirements than most salmonids (Rieman and McIntyre 1993). The distribution and abundance of bull trout are most influenced by: water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Fraley and Shepard 1989; Goetz 1989; Rieman and McIntyre 1993, 1995; Watson and Hillman 1997). Watson and Hillman (1997) concluded that watersheds must contain specific physical characteristics that provide the habitat requirements necessary for spawning and rearing bull trout and these characteristics are generally not present throughout the watershed. Similarly, Rieman and McIntyre (1993) and Rieman et al. (1997) found bull trout exhibit patchy distribution, even in pristine watersheds, and do not simultaneously occupy all available habitats. All life-history stages are associated with complex forms of cover, including large woody debris (LWD), undercut banks, boulders, and pools (Fraley and Shepard 1989; Goetz 1989; Watson and Hillman 1997).

Spawning - Bull trout have specific spawning habitat requirements, spawning only in a small percentage of the available stream habitat. In western Montana, Flathead Lake bull trout spawned in 28 percent of the 750 kilometers (469 miles) of available stream habitat surveyed in

1978-1982 (Fraley and Shepard 1989). Similarly, in the Swan River drainage, 75 percent of the bull trout spawning in 1983 and 1984 occurred in 8.5 percent of the available habitat (Leathe and Enk 1985). Cover, substrate composition, and water quality are important spawning habitat components (Reiser and Bjornn 1979). Spawning areas are usually less than 2 percent gradient (Fraley and Shepard 1989) and water depths ranged from 0.1 to 0.6 meters (4 to 23 inches) and average 0.3 meters (12 inches) (Fraley et al. 1981). Bull trout redds are vulnerable to scouring during winter and early spring flooding and low winter flows or freezing substrate (Cross and Everest 1995).

Cover, provided by overhanging vegetation, undercut banks, submerged logs and rocks, water depth, and turbulence, protects spawning fish from disturbance or predation. Since some bull trout enter streams weeks or months prior to spawning, they are vulnerable without adequate cover (Fraley and Shepard 1989). Closeness to cover is also a major factor when bull trout select a spawning site (Fraley and Shepard 1989). Suitability of gravel substrates for spawning varies with size of fish (larger fish use larger substrates), and spawning occurs in loosely compacted gravel and cobble substrate at runs or pool tails (Fraley and Shepard 1989). Initiation of spawning by bull trout appears to be strongly related to water temperature (5 to 9 degrees Celsius [°C]), and possibly also photoperiod and streamflow (Shepard et al. 1984a). Also, bull trout spawning occurs in areas influenced by groundwater (Ratliff 1992).

Incubation/Emergence – Incubation and fry emergence success depends on the conditions of gravel, surface flow, and water temperature. Spawning gravel with reduced fines (less than 35-40 percent fine sediment) and organic material is more suitable for incubating embryos (Reiser and Wesche 1979). Water temperature should be around 2 to 4°C and no higher than 8°C (Weaver and White 1985). Fry emergence coincides with spring runoff and ground water influence (Weaver and Fraley 1991). After hatching, juvenile fish rear in low velocity water, substrate interstices, or close proximity to larger substrate and submerged woody debris (Shepard et al. 1984b).

Juvenile Rearing – Rearing juveniles disperse and use most of the suitable and accessible stream areas within a drainage (Leider et al. 1986). Water temperature, quality and cover (substrate and LWD) determine distribution and abundance of juveniles (Fraley and Shepard 1989). Juveniles rarely are found in streams with temperatures above 15°C and excess sediment reduces useable rearing habitat and macroinvertebrate production (Fraley and Shepard 1989).

Adults and Young in Streams, Rivers, and Lakes – Channel stability, substrate composition, cover, water temperature, and migratory corridors are important for fluvial and adfluvial adult and young fish rearing and movement in streams (Rieman and McIntyre 1993). Deep pools with abundant cover (larger substrate, woody debris, and undercut banks) and water temperatures below 15°C are important habitat components for stream resident bull trout (Goetz 1989). Fluvial bull trout over-winter in pool and run habitats (Elle et al. 1994). Most fluvial bull trout remained in the same habitat type after entering the main river from tributaries (Elle et al. 1994). In large river systems, used as migratory corridors for fluvial and adfluvial bull trout, large oxbow lakes, groundwater influenced floodplain ponds and sloughs adjacent to the main channel are important habitat components in all seasons (Cavallo 1997).

Lakes and reservoirs are very important for adfluvial bull trout, as they are the primary habitat for rearing and growth of young and adults (Leathe and Graham 1982).

WESTSLOPE CUTTHROAT TROUT

Distribution

Westslope cutthroat trout were once abundant throughout much of the north and central portions of the Columbia River basin. Although still widely distributed, habitat loss and genetic introgression through hybridization (Rieman and McIntyre 1993) may seriously comprise remaining populations. Where habitat remains in relatively good condition, westslope cutthroat trout are often found in most streams accessible to them (Rieman and McIntyre 1993). Westslope cutthroat trout now generally exist above barrier falls that have limited distribution of other species (Behnke 1992). First recorded as abundant in the Lewis and Clark expedition (Behnke 1992) in Idaho, westslope cutthroat trout are currently found in Kootenai, Moyie, Pend Oreille, Priest, Coeur d' Alene, St. Joe, Spokane, Clearwater, Lochsa, Selway, and Salmon river systems (Lee and others 1997). Westslope cutthroat trout are presently considered as a sensitive species by IDFG. Westslope cutthroat trout are found in the mainstem Lower Priest River and all accessible perennial tributaries.

Life History Characteristics and Habitat Relationships

The westslope cutthroat trout can occur in three life-history forms in a single basin; adfluvial (fish that spawn in tributary streams and spend most of their life in a lake); fluvial (fish that spawn in tributary streams and spend most of their life in rivers); and resident (fish that spend their entire life in a single stream). Resident forms predominate in headwater areas while migratory forms are more common in mid and lower basin habitats (Rieman and McIntyre 1995). Westslope cutthroat trout mature at age three, but first spawning occurs mostly at age four or five. Sexually maturing fluvial and adfluvial fish move near spawning tributaries in the fall and winter where they remain until migrating upstream in the spring to spawn (Liknes 1984). Because of their movement and distribution, and life histories, maintenance of habitats across relatively large areas, including river and lake basins, is required.

Westslope cutthroat trout are generally found in waters that are relatively cold and nutrient poor (Rieman and Apperson 1989). Growth varies widely and is probably influenced by stream and lake productivity, but is generally higher for migrant forms. Growth influences relative productivity and resilience of populations to disturbance and increased mortality. Substrate composition strongly influences survival. Weaver and Fraley (1991) showed a negative relationship between emergence success and the percentage of fine sediment. Sediment reduces embryo survival (Irving and Bjornn 1984) and food and space for rearing juveniles (Bjornn et al. 1977). Highly embedded substrates have been negatively correlated with juvenile abundance (Thurow 1987) and may be particularly harmful to trout that enter substrate in winter (Peters 1988).

The distribution and abundance of larger westslope cutthroat trout has been strongly associated with the number and quality of pools (Peters 1988; Pratt 1984). High quality of pools appears to be especially important as wintering habitat (Peters 1988). Habitats that provide some form of cover also seem to be preferred (Pratt 1984). Overall, the association of westslope cutthroat trout with habitat characteristics influenced by land management suggests they are vulnerable to habitat disruption.

TORRENT SCULPIN

Distribution

The torrent sculpin inhabits rivers and streams in the Columbia basin drainages in the states of Oregon, Washington, Idaho, Montana, and British Columbia (Maughan 1976). Historically, the torrent sculpin was found throughout tributaries of the mid and upper Columbia River Basin, overlapping range with the shorthead sculpin (Lee and others 1997). In Idaho, the torrent sculpin has been found in the Kootenai, Pend Oreille, Spokane, Clearwater, Salmon, St. Maries, upper Clark Fork, Palouse river drainages, Snake River below Shoshone Falls, and Rochat Creek in the St. Joe River (McPhee 1966; Simpson and Wallace 1978). The torrent sculpin is listed as a sensitive species by the USFS in Region 1. Torrent sculpins could be found in the mainstem Lower Priest River and all accessible perennial tributaries.

Life History Characteristics and Habitat Relationships

The torrent sculpin is primarily a benthic stream species but also occurs in lakes (Wydowski and Whitney 1979). In streams, they inhabit swift, cool, clear riffles with a stable bottom of scattered rubble, gravel, and boulder substrate (Simpson and Wallace 1978). Torrent sculpin were found only where rock substrate was present. Spawning, which occurs in riffles with rubble or boulder substrate, starts in early spring and lasts to late April. The torrent sculpin is susceptible to land use practices (i.e., road construction) and climatic events that degrade water quality and natural habitat conditions (Lee and others 1997).

3.2.2 Existing Conditions

3.2.2.1 LOWER PRIEST RIVER

The Lower Priest River, with mean average flows ranging from over 5,000 cfs in May to around 200 cfs from late July to October and a maximum recorded flow of 10,700 cfs (May 1997) and a minimum flow of 150 cfs (November 1979), drains 219,980 acres (USGS gauging station #12395000, near Priest River). The Lower Priest River from the outlet of Priest Lake to its mouth is approximately 45.5 miles in length. The Lower Priest River is separated into nine units, two of which are in the project area: Quartz Creek (7,081 acres) and Upper River Sidewall that includes Dubius, Murray, and Cottonwood creeks (18,776 acres). These units combine to total 11.7 percent of the drainage area (State of Idaho 2001). The Lower Priest River watershed consists of 18 percent private, 51 percent federal, and 31 percent State of Idaho land. Most of the Lower Priest River watershed in the project area burned from 1925 to 1939 (State of Idaho 2001). The Quartz-Cottonwood Road Project starts just upstream from McAbee Falls on the Lower Priest River, at about RM 13.8, and ends at about RM 21. Jasper Mountain (3,873 feet) is the highest point on the west side of the Lower Priest River.

The Lower Priest River floodplain consists of glacial till and outwash, alluvial and lacustrine deposits (State of Idaho 2002). Some streambanks contain mature conifers, cottonwood, and shrubs. The Lower Priest River is listed on the 303(d) list, mainly for excessive sediment (State of Idaho 2002). FSR 334 closely parallels the Lower Priest River at six sites, totaling about 5,473 feet in river length.

Riparian vegetation consists of birch (*Betula sp.*), quaking aspen (*Populus tremuloids*), cottonwood (*Populus sp.*), alder (*Alnus sp.*), dogwood (*Cornus sp.*), and willow (*Salix sp.*) in the valley floodplain and mixed conifers in the uplands. The only fish survey conducted on the Lower Priest River was in 1998 (Brennan et al. 2000) and mountain whitefish, largescale sucker, and northern pike minnow were the only coldwater fish captured in this survey, which was 10 miles downstream from the project area. The mainstem Lower Priest River is primarily used by mountain whitefish, and brown and rainbow trout for spawning (personal communication, Corsi 2003). Historically, the Lower Priest River was a popular fluvial westslope cutthroat fishery (State of Idaho 2002).

The most important function for fish in the Lower Priest River is providing a migration corridor for fluvial and/or adfluvial bull trout migrating from Lake Pend Oreille and the Priest River to the East River watershed (Dupont and Horner In press). Priest River does not appear to provide over-winter habitat to bull trout (Dupont and Horner In press). Bull trout in the Lower Priest River (Lake Pend Oreille Core Area) are currently found in the mainstem Lower Priest River and the East River watershed, including the Middle Fork and Uleda and Tarlac creeks (USFWS 2002). The East River bull trout population is unique, representing a population whose adults migrate downstream from Pend Oreille Lake into the Pend Oreille River and then upstream in East River to spawn (Dupont and Horner In press). Historically, tributaries of the Lower Priest River were probably important adult and subadult foraging and thermal refuge areas for bull trout (USFWS 2002). Recovery measures listed in USFWS (2002) are reducing sediment sources by stabilizing and upgrading roads and crossings, and eliminating culvert barriers.

3.2.2.2 QUARTZ CREEK

Quartz Creek is about 6 miles in length, with the first mile a Rosgen B channel and the next 5 miles an Rosgen E channel. There are 18 miles of perennial stream in the watershed (USFS 2000). Of the 7,081 acres, 1,334 acres are private inholdings (USFS 2000). The watershed experienced stand replacement fires from 1926 to 1931 and 20 percent of the watershed has been logged. The mean annual flow in Quartz Creek is around 23 cfs (USFS 1999). The watershed was determined to be functioning at risk, with a watershed and riparian road densities of about 5.0 miles/square miles, a moderately-stable trending toward unstable channel, and low sediment delivery (USFS 1999). A fish survey conducted in 1987 by IDFG found abundant brook trout and sculpins, and low numbers of westslope cutthroat and brown trout. Quartz Creek is considered to have low importance in bull trout recovery (Horner et al. 1987). The Quartz Mountain Road crosses Quartz Creek in three places and parallels Quartz Creek for about 0.4 miles in Section 36 of T 58 N, R5W. The August 2003 survey of road crossings found that the lower Quartz Creek culvert was probably a barrier to upstream migrating fish. The remaining two crossings (one bridge and one culvert) are passable.

3.2.2.3 COTTONWOOD, MURRAY, AND DUBIUS CREEKS

FSR 334 (Gleason-Boswell Road) crosses Cottonwood, Murray, and Dubius creeks with three culverts, 30, 48, and 36 inches in diameter, respectively, all on grade and passable for fish. These creeks are mixtures of Rosgen B, C, and mostly E channels. Cottonwood and Murray creeks both flow for over three miles before entering an old isolated oxbow lake in the Lower Priest River floodplain at around RM 24. Dubius Creek flows for about three miles before entering the Priest River at RM 33. Cottonwood and Dubius creeks were dry during the 2003 survey. Cottonwood Creek has a well developed grass/shrub/alder riparian floodplain community, with a flat gradient, silt/sand substrate and, when flowing, contained poor potential habitat for salmonids. Dubius Creek does not have a well developed deciduous riparian floodplain, has some shrub and alders and a mature conifer overstory. The channel appears to flow mainly during spring runoff and contained poor habitat for salmonids. Murray Creek has a well developed grass/shrub/alder riparian floodplain community and mature conifer overstory, with a flat gradient and silt/sand substrate. Although salmonid fish habitat conditions were poor in Murray Creek (see Table 2-2), one trout about 4 inches in length was observed just upstream from the culvert (personal observation, House 2003).

3.2.2.4 PROJECT SITE CHANNEL AND RIPARIAN CONDITION

Tables 3-5 and 3-6 depict the general riparian and aquatic habitat conditions for six sites along the Lower Priest River, three crossings on Quartz Creek, and one crossing on Murray Creek. Table 3-7 depicts general conditions of named or unnamed streams that are either perennial (spring fed) or ephemeral that cross the Quartz-Cottonwood Roads. Streams listed in Table 3-7 were steep, had no or limited access to fish-bearing streams and because of their small size contained poor salmonid habitat. All other tributary streams shown on the USGS 7.5- minute quads (Quartz Mountain, Outlet Bay, and Prater Mountain) that cross the road were dry, with no fish habitat.

Table 3-5. Existing Fish Passage, Channel Constriction, and Riparian Habitat Conditions in the Lower Priest River Where Six Reaches of FSR 334 are Located Within a 150-foot Riparian Management Area

Habitat Characteristics	LOWER PRIEST RIVER					
	RM 13.8	***RM 14.8***	***RM 15.3***	***RM 19***	***RM 19.5***	***RM 20.5***
Fish passage[1]	Y	Y	Y	Y	Y	Y
Channel constriction[2]	Y	N	N	N	N	N
Distance from road edge (ft)	0	141	72	105	105	82
Channel length (ft)	1,808	364	814	1,329	512	646
Floodplain width (ft)[3]	230	220	276	272	584	1,624
Average wetted channel width (ft)	197	154	187	200	148	138
Riparian habitat conditions						
Vegetation types[4]	XX1	CD1	CD1	CD1	CD1	CD1
Stable streambanks (percent)	100	100	100	100	100	100
Large woody debris (#/mile)	2.5	0	29	0	0	106
Instream habitat types (percent)						
Pools	9	-	33	30	50	100
Riffles	0	100	10	70	-	-
Glides	81	-	67	-	50	-
Pool habitat						
Pool frequency (#/mile)	2.5	0	5.9	11	11	11
Large pools (#/mile)	2.5	0	5.9	11	11	11
Pool size (max. depth in ft)	6+	0	6+	6+	6+	6+
Substrate (total)						
Fines (percent)	40	-	50	30	40	50
Gravel (percent)	60	50	25	10	30	25
Cobbles (percent)	-	50	25	50	25	25
Boulders (percent)	-	0	-	10	5	-
Width-to-depth ratio (Riffles)	-	148	30	-	-	-
Width-to-max. depth ratio (Pools)	20	-	21	25	25	25
Off-channel habitat (percent)	0	0	5	0	0	0
Floodplain connectivity [5]	Y	N	N	N	N	N

Notes:
1. Fish passage at crossing (Y = Yes, N = No)
2. Bankfull channel constricted by existing structure (Y = Yes, N = No)
3. Current 100-year floodplain measured from FEMA floodplain maps, with the floodplain reduced from past road construction at RM 13.8.
4. XX1 = tree canopy is less than 10 percent; shrub canopy is less than 10 percent; less than 10 percent plant cover; CD1 = tree canopy is more than 10 percent, shrub canopy is 10 percent or more.
5. Current floodplain has been reduced from past road construction.

Source: Overton et al. 1997.

Table 3-6. Existing Fish Passage, Channel Constriction, and Riparian Habitat Conditions in the Lower Priest River Where the Quartz Mountain and FSR 334 Roads Cross or Parallel a Riparian Management Area

	PERENNIAL TRIBUTARIES IN THE PROJECT AREA			
Habitat Characteristics	***Lower Quartz Creek***	***Middle Quartz Creek***	***Upper Quartz Creek***	***Murray Creek***
Fish passage[1]	N	Y	Y	Y
Channel constriction[2]	Y	Y	Y	Y
Channel length (ft)	160	100	100	100
Floodplain width (ft)	18	100	60	30
Average wetted channel width (ft)	9	14	1.5	3
Riparian habitat conditions				
Vegetation types[3]	BB2	BB2	BB2	BB2
Stable streambanks (percent)	100	100	100	100
Large woody debris (#/mile)	300	0	0	0
Instream habitat types (percent)				
Pools	20	100	-	-
Riffles	70	-	100	50
Glides	10	-	-	50
Pool habitat				
Pool frequency (#/mile)	66	-	-	-
Large pools (#/mile)	33	-	0	-
Pool size (max. depth in ft)	2	4	-	-
Substrate (total)				
Fines (percent)	30	100	100	80
Gravel (percent)	10	-	-	20
Cobbles (percent)	20	-	-	-
Boulders (percent)	40	-	-	-
Width-to-depth ratio (Riffles)	24	-	15	18
Width-to-max. depth ratio (Pools)	7.5	3.5	-	-
Off-channel habitat (percent)	0	0	0	0
Floodplain connectivity[4]	Y	Y	Y	Y

Notes:
1. Fish passage at crossing (Y = Yes, N = No)
2. Bankfull channel constricted by existing structure (Y = Yes, N = No)
3. BB2 = Tree and shrub canopy is more than 10 percent, dominant tree species are broadleaf deciduous trees more than 20 feet tall at maturity, alder, willow, and dogwood.
4. Current floodplain has been reduced from past road construction.

Table 3-7. Steep Creek and Other Unnamed Perennial Tributaries Crossed by Quartz-Cottonwood Project Roads

Stream	*Perennial/Ephemeral*	*Fish Passage (Y/N)*	*Useable Salmonid Habitat (Y/N)*	*Definable Channel (Y/N)*	*Estimated Flow (cfs)*
Steep Creek	Ephemeral	N	N	N	0
Tributary #4	Perennial	Y	N	Y	1/8
Tributary #9	Perennial	Y	N	Y	1/16
Tributary # 10	Perennial	Y	N	Y	1/8
Tributary #11	Perennial	Y	N	Y	1/16

3.2.3 Environmental Consequences

3.2.3.1 SIGNIFICANCE CRITERIA

This analysis uses the best available scientific information, current reach and site-specific information, and professional judgment to determine potential effects. This analysis also uses results from the "Checklist" in Tables A-1 through A-4 in Appendix A to arrive at a determination of the potential effects of the proposed action on bull trout and its habitat. The effect on bull trout is based on an assessment of selected bull trout relevant indicators that have the potential to change with or without implementation of the project. These indicators are: 1) suspended and bedload sediments; 2) pool frequency; 3) floodplain connectivity/fish passage; 4) LWD; and 5) riparian reserves.

3.2.3.2 POTENTIAL IMPACTS AND MITIGATION

The following is a discussion of the potential effects of the no action alternative and the proposed action on bull and westslope cutthroat trout and torrent sculpin, their respective spawning, incubation, and rearing habitat, and water quality.

Although this project has the potential to directly and indirectly impact bull trout habitat by increasing suspended and possibly bedload sediment, and reduce riparian reserve areas, this analysis has determined that the risk of any adverse effects on these fish, habitat, or water quality is low for the project. Water temperatures are affected by the amount of shade provided by riparian vegetation. Because riparian canopy would not be reduced under the proposed alternative, the project would have no measurable effect on water temperature regimes in the short- and long-term in the Lower Priest River. Tables A-1 through A-4 (Appendix A) document environmental baseline (as of August 25 to 26, 2003) and effects of road construction in the Lower Priest River on relevant indicators for bull trout.

ALTERNATIVE 1: NO ACTION

Under the no action alternative, current aquatic habitat conditions and fish passage on Quartz Creek would be maintained. Salmonid passage at the lower culvert on Quartz Creek would remain not passable for potential juvenile bull trout rearing.

ALTERNATIVE 2: PROPOSED ACTION

This discussion addresses the indicators used to analyze effects, then discusses each major creek in the project area.

Site-specific BMPs would be incorporated to ensure protection of aquatic resources. BMPs are the primary mechanism to enable the achievement of water quality standards. The Forest Service Handbook 2509.22 (Soil and Water Conservation Handbook) outlines BMPs that meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

The selection and design of BMPs are an integral part of the IPNF's Land and Resource Management Plan Standards and Guidelines for Water (IPNF 1987, pages II-33 and Appendix S). These standards and guidelines have a high effectiveness in maintaining the integrity of aquatic ecosystems.

Suspended and Bedload Sediments

Implementation of the project could increase short-term suspended sediment levels to the Lower Priest River at the project site and in downstream reaches. However, conducting instream work during low flow conditions and employing BMP measures to reduce or stop suspended sediment from entering the active channel should reduce or eliminate most short-term increases in turbidity.

With BMPs and provisions in project design and standard and guidelines employed, there would be no impact on bull trout from excessive amounts of fine sediment entering flowing waters in the project area. Re-suspension of existing fine sediment would probably cause temporary, short-term increases in turbidity downstream from possible culvert installation. These increased suspended sediment levels would probably not exceed normal turbidity levels that occur during seasonal runoff events. Currently, higher than natural turbidity levels probably occur in project area streams due to upstream combinations of development, grazing, logging, roads, and agricultural activities. Due to timing and method of removal, any increases in suspended sediment would have no impacts to bull trout. Currently, the Lower Priest River and Quartz Creek are probably not functioning at acceptable levels for percentages of fine substrate.

Pool Frequency

Land use activities that alter the hydrology or sediment regime, reduce inchannel LWD and riparian vegetation, or destabilize banks can result in loss of pools or reduce pool size. Project design and implementation of BMPs would prevent alteration of channel morphology or riparian vegetation. Implementation of the project would not reduce existing pool habitat and/or create substantial amounts of fine or coarse sediment that would fill downstream pools.

Floodplain Connectivity

Floodplain connectivity includes off-channel areas, wetlands, and riparian areas that are frequently hydrologically linked to the main channel by overbank flows. Elimination or reduction of these areas can decrease the productivity of aquatic systems. Project design and implementation of BMPs would prevent alteration of channel morphology, overbank flows, or riparian vegetation. The project would have no effect on floodplain connectivity.

Large Woody Debris

The project would have no measurable effect on LWD recruitment for Lower Priest River as long as road improvements or widening along the Lower Priest River occur upslope from the existing road.

Riparian Reserves

Implementation of the project would not have any substantial effects on riparian habitat within the specific project area. Some mature deciduous riparian trees may be removed within the project area. With BMPs and provisions in project design, standards and guidelines, and mitigation measures employed, there would be no impact in the short-term on bull trout from reductions in RHCAs in the project area.

Murray Creek

In Murray Creek, there would be no or little aquatic habitat or fish populations under the proposed action because of design provisions and BMPs that would prevent alteration of channel morphology or riparian vegetation. Potential impacts would mainly be slight increases in suspended sediment at the new stream crossing. Culverts will be designed to minimize erosion and sedimentation. The installation of culverts capable of passing the 100-year flow event is expected to reduce the scouring of the channel bottoms of Murray Creek and other streams that are tributary to the Priest River, thereby reducing the overall sediment load of the tributaries and the river. Culvert inlets will be armored to prevent the stream from eroding or undercutting the pipe. Additionally, the stream channel below the outlet will be armored, in order to dissipate energy. IPNF will perform regular scheduled road maintenance and culvert inspection.

Quartz Creek

In Quartz Creek, there would be no impact to aquatic habitat or fish populations because of the existing road location and stream crossings under the proposed action. Potential impacts would mainly be slight, temporary increases in suspended sediment at three new stream crossings during construction.

Priest River

In the Priest River, there would be no impact to aquatic habitat or fish populations because of the existing road location and stream crossings under the proposed action. Any potential impacts would be minimized by project design provisions, construction methods, timing of instream work, and minimization of new construction within riparian reserves. These factors would determine the amount and timing of increased sediment loads in the Priest River for the proposed action. The slight, temporary increases in suspended sediment in the Priest River associated with road and culvert upgrades would not affect the success of salmonid spawning and rearing in the river.

Number of Stream Crossings on Fish-Bearing Streams

Fish-bearing streams in the area of potential effect are Quartz, Cottonwood, Murray, and Dubius Creeks. Of the 19 stream crossings that would be part of the proposed action, 3 are on Quartz Creek, 1 on Cottonwood Creek, and 1 on Murray Creek. Culverts currently exist on all of these stream crossings. In conjunction with the roadway upgrade, stream crossing culverts would be upgraded to allow the passage of the 100-year flow event. This is expected to reduce sediment delivery to streams by several mechanisms. Replacing undersized and misaligned culverts may reduce channel scour and streambank erosion by reducing culvert-induced channel scour. Upgrading undersized culverts will reduce the potential for mass wasting of the roadbed resulting from culvert failure. Upgrading culverts may also reduce severe road surface erosion noticeable during spring snowmelt when local flooding saturates the roadbed and converts the road surface to mud. During and immediately following construction, re-suspension of existing fine sediment will probably cause temporary, short-term increases in turbidity downstream from possible culvert installation. However, the overall impact of the project may result in a net reduction of sediment delivery to the Priest River and its fish-bearing tributaries due in large part to the proposed culvert replacements.

MITIGATION MEASURES

With the following mitigation measures, including provisions in project design, and the use of BMPs and standards and guidelines, there should be minimal to no impact in the short-term on bull and westslope cutthroat trout and torrent sculpin from increases in suspended sediment and reductions in riparian reserves in the Quartz Creek and Priest River project areas.

Incorporating the following actions into the Quartz-Cottonwood Road Project design will ensure bull trout are not adversely affected by the work. Appropriate implementation of these actions will vary based on local stream, river, wetland, or riparian conditions.

In addition to the specific mitigations described below, the USFS will observe BMPs provisions, and follow standards and guidelines described in INFISH RMOs (USFWS 1998) to comply with state and federal water quality standards, toxic effluent standards, and any potential adverse impacts from discharge to the aquatic systems.

Sediment Reduction

Currently, the Lower Priest River in the project area is not functioning appropriately in terms of amounts of fine sediment. At all stream crossings and or roads within the designated riparian management area, employing BMPs, as described in Forest Service Handbook 2509.22 and the IPNF Forest Plan, prior to construction will prevent suspended or bedload sediment from entering the floodplain channel.

Fish Passage

Currently, fish passage is not a problem on the Lower Priest River in the project area. However, there is limited or no fish passage on lower Quartz Creek. Changing culverts on Quartz Creek to pass the 100-year flood event and provide fish passage will provide access to fluvial bull trout.

Project Timing

Exclude activities that may affect streams *except* between July 15 and September 1, the window between the westslope cutthroat spawning and bull trout spawning seasons.

Location of Project-related Activities

For the Quartz-Cottonwood Road Project, RHCAs should be delineated along every waterbody within the project area. Construction activities will be excluded within RHCAs, unless appropriate monitoring, design, standards and guidelines, and mitigation/compensation are employed. The level of design, standards and guidelines, and mitigation or compensation would be different depending on the category of stream (i.e., higher for a Category 1 stream compared to a Category 3 stream). All streams, rivers, and wetlands in the project area are Category 1, 2, 3, and 4 and have RHCAs with standard widths as defined by INFISH (1995). For each stream crossing or river alignment, site-specific RHCA widths and the rationale used to arrive at specific widths will be established after field surveys conducted by an IDFG (or designated biologist) fish biologist and agreed upon after consultation with the USFWS.

Project Monitoring

To assure no adult migrating or spawning bull trout are using any of the streams crossed during the scheduled instream work period, monitoring by a designated observer will be conducted.

The USFWS (1998) has revised the INFISH RMOs, describing good habitat for resident and migratory bull trout, to develop a "Checklist for documenting environmental baseline and effects of proposed actions(s) on relevant indicators" (Appendix A) for evaluating the effects of human activities on bull trout and its habitat.

Where highway construction activities are planned in the active channel and its floodplain and within designated RHCAs, the USFWS checklist must be filled out.

Project Design

- Road construction activities should not disturb or destroy bull trout migratory, spawning, or rearing habitat.

- During road construction activities, BMPs will be used to maintain water quality. An SWPPP will be developed and implemented.

- Staging areas, rock and gravel borrow sources, and waste material disposal sites associated with highway construction projects will be located outside RHCAs and stream floodplains to avoid impacts to bull trout habitat.

- If blasting is planned as part of road construction activities, a blasting plan that includes provisions to avoid disturbances to bull trout will be prepared and implemented.

- Road construction project contracts will include a provision that allows construction activity to be halted if an adverse effect to bull trout is occurring.

- Where road construction activities disturb vegetative communities in bull trout habitat, vegetation will be planted to assure bank stability and establishment of a well-developed riparian overstory. A re-vegetation plan will be prepared and made available to the IDFG.

- Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood and its associated bedload and debris. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

- Provide and maintain fish passage at all road crossings of existing and potential streams supporting bull trout.

- Prohibit storage of fuels and other toxicants and refueling within RHCAs.

- Use land exchange and conservation easements to meet RMOs and facilitate restoration of bull trout.

- Establish a designated refueling area for fuel, oil, and other hazardous materials outside of standard RCHAs, based on INFISH (1995), to insure that accidental spills cannot impact water quality or bull trout habitat.

- Prepare and make available to DEQ a hazardous materials spill prevention/contingency plan where road construction activities are planned in bull trout habitat.

- Minimize road locations in RHCAs, by crossing at right angles or eliminating.

- Establish mitigation plans for road failures.

- Avoid sediment delivery to stream from road surface by:

  - Outsloping the roadway surface, except in cases where outsloping would increase sediment delivery to streams or where outsloping is not feasible or would be unsafe.

  - Routing road drainage away from potentially unstable stream channels.

  - Applying appropriate BMPs (i.e., straw bales, silt fences, geotextiles, rolling dips and open tops, rocking unstable areas, strategically placed relief pipes, etc.)

- Avoid disruption of natural hydrologic flow paths.

- Avoid sidecasting of soils and snow (especially where the road closely parallels the Priest River). Sidecasting of road material is prohibited on road segments within or abutting RHCAs along the Priest River in bull trout habitat. For other sidecast areas, seeding, mulching, slope armoring, silt fences, etc. should be applied to prevent sediment delivery to streams.

- Reconstruct road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of RMOs, or do not protect bull trout habitat from increased sedimentation.

- Prioritize reconstruction based on the current and potential damage to bull trout and its habitat, the ecological value of the riparian resources affected, and the feasibility of options such as road relocation out of RHCAs.

Estimated Effectiveness of Mitigation Measures

The estimated effectiveness of the practices described above is high. Stream protection zones (Streamside Management Zones) have been shown to be effective in moderating cumulative watershed effects. These practices comply with fish habitat protection standards and guidelines in INFISH. The proposed alternative includes stream protection zones that meet or exceed INFISH requirements. These standards and guidelines have a high effectiveness at maintaining the integrity of aquatic ecosystems. Riparian management objectives would be met in all activities associated with this project. In meeting INFISH standards for existing and planned roads, the risk of increased sediment delivery to streams would be minimized.

3.2.3.3 CONSISTENCY WITH FOREST PLAN AND OTHER REGULATIONS

Based on the information presented in this document, both alternatives would meet the Forest Plan Fisheries Standards 1987) as amended by INFISH (1995). Before implementing this decision, consultation will be carried out with the USFWS. Implementation of any alternative would not result in a loss of viability for any fish species within the Forest Planning area.

3.2.4 Cumulative Effects

Cumulative effects (50 CFR 402.02) are effects of past, existing, or future state or private activities that are reasonably certain to occur in the watershed where the action occurs. The cumulative effects analysis area is defined as the Quartz Creek, Cottonwood Creek, and Murray Creek drainages, which have been highly impacted by past human activities, including livestock grazing, logging, agriculture, rural development, and roads (State of Idaho 2003). Non-project effects include effects from activities including fire suppression, off road vehicle use, road maintenance, activities on private lands, road decommissioning, livestock grazing, and recreational trails.

Fire suppression, off road vehicle use, road maintenance, activities on private lands, road decommissioning, livestock grazing, and recreational trails use can have a negative impact on the fisheries of the project area. However, these can be offset through management of the fisheries as described under mitigations.

The following list describes ongoing projects on National Forest lands within the cumulative effects analysis area that could have the potential to influence wildlife and wildlife habitat. Design criteria have been included in Chapter 2.0 to avoid or minimize these potential effects.

ONGOING AND REASONABLY FORESEEABLE ACTIONS

Weed treatment and monitoring – Weed treatment activities apart from those listed as mitigation by design features (section 2.7) would be subject to available funding. Any such activities would follow guidelines established in the Priest Lake Noxious Weeds Control Project Final EIS (USFS 1997). No impacts to aquatic resources beyond those described in the Final EIS are expected to occur.

Chips Ahoy Forest Restoration Project – This project includes vegetation treatments on as many as 1,680 acres, with construction of as many as 2.5 miles of temporary roads. Vegetation treatments would include mechanical and chemical treatments. A Draft EIS evaluating potential project effects was released in February 2004. Under design characteristics for the project, streams and riparian areas will be buffered. Impacts at the project level would not be expected to lead to the decline of any threatened, endangered, and sensitive species. The Chips Ahoy project would result in a short-term increase in sediment delivery, but an overall reduction in sediment risk in the long term. Because of the scope of the Chips Ahoy and Quartz-Cottonwood projects, and with measures designed to protect sensitive wildlife resources, cumulative impacts from these projects would not be significant at the regional scale.

Routine road maintenance activities on open roads in the project area – Road maintenance activities (i.e., blading, brushing, and culvert cleaning) typically improve drainage and decrease long-term erosion caused from road surface runoff and stream channel degradation. Road decommissioning may contribute sediment during construction activities although implementing standard BMPs would minimize this. The long-term effect of road decommissioning may be a significant reduction in erosion as a result of re-contouring and re-vegetating roadbeds. Future brushing, maintenance of open roads would not impact any aquatic habitat.

Activities on private land adjacent to the project area – Activities on private lands (e.g., riparian clearing and heavy machinery use) can have detrimental effects to water resources by causing channel instability and altering channel morphology. Livestock grazing and recreational trails affect channel morphology in localized areas (e.g., locations where trails cross streams or livestock access the stream) causing increased sedimentation into local streams; however, the effect is minimal on a watershed scale.

The cumulative effect of these activities can be partially offset by the proposed action of upgrading the roadbed and replacing undersized/insufficient culverts. An overall net decrease in sediment yield and improved channel morphology is anticipated. The potential short-term increase in sediment would not impact fish populations. In the long term, the reduction in sediment yield is expected to benefit survival of individuals.

No cumulative effects to water temperatures within the Lower Priest River drainage are expected due to current or future timber harvest; the implementation of INFISH buffers would protect shade-providing riparian vegetation.

With implementation of design restrictions and mitigations for the Quartz-Cottonwood road improvement project, the proposed action would not affect most wildlife species with potential to occur in the project area. Timber harvest, forest restoration, noxious weed control, and road maintenance all have potential to affect wildlife and habitat within the cumulative effects analysis area. However, because of the scope of the project and its expected low level of impact based on project design and mitigation, the Quartz-Cottonwood project would not contribute to cumulative impacts beyond the project area.

3.3 WILDLIFE

3.3.1 Definition of Resource

Wildlife includes all terrestrial vertebrate animals, including those with special protection status. Typical animals include species groups such as snakes, lizards, songbirds, waterfowl, raptors, ungulates, carnivores, rodents and other small mammals, and bats. The attributes and quality of available habitats determine the composition, diversity, and abundance patterns of wildlife species assemblages, or communities. Each species has its own set of habitat requirements and inter-specific interactions driving its observed distribution and abundance. Community structure is derived from the net effect of the diverse resource and habitat requirements of each species within a geographic setting. For this reason, an assessment of habitat types and area affected by the proposed action can serve as an overriding determinant in the assessment of impacts for wildlife populations.

Special status wildlife species are defined as those currently federally listed, proposed for listing, or candidates for listing as endangered or threatened under ESA. They also include species designated as sensitive by the IPNF or the USFS Regional Office. Special status wildlife species that occur or have potential to occur in the project area are listed in Appendix B; the list is derived from IDFG Idaho Conservation Data Center (ICDC) lists of species that have been recorded or have potential to be found in Bonner and Boundary Counties. The list includes three of the six wildlife species within Idaho listed as either Endangered or Threatened under the ESA and 14 species designated by the IPNF as sensitive. Nineteen species considered to be of special concern by the ICDC and documented to occur in or near the project area are also listed.

The regulatory framework providing direction for the protection and management of wildlife and wildlife habitat comes primarily from the following sources:

- ESA of 1973 (as amended)
- The NFMA
- IPNF Forest Plan

Section 7(a) (2) of the ESA of 1973 (as amended in 1978, 1979, and 1982), requires all federal agencies to review all actions authorized, funded, or carried out by them to ensure that actions authorized, funded, and/or conducted by them are not likely to jeopardize the continued existence of any federally listed species, or result in destruction or adverse modification of designated critical habitat for such species.

3.3.2 Existing Conditions

3.3.2.1 WILDLIFE

Most wildlife habitat in the eastern and southern portions of the project area consists of western red cedar (*Thuja plicata*) forest. The northern and eastern portions of the project area are dominated by stands of lodgepole pine (*Pinus contorta*). Riparian vegetation consists of birch (*Betula sp*.), quaking aspen (*Populus tremuloids*), cottonwood (*Populus sp*.), alder (*Alnus sp*.), dogwood (*Cornus sp*.), and willow (*Salix sp*.) in the valley floodplain and mixed conifers in the uplands.

Common mammals in the project area include mule deer, white-tailed deer, elk, black bear, red squirrel, and coyote. Bird species common in the area include ruffed grouse, spruce grouse, common raven, great-horned owl, hairy woodpecker, northern flicker, American robin, red-breasted nuthatch, black-capped chickadee, dark-eyed junco, and yellow-rumped warbler.

3.3.2.2 SPECIAL STATUS WILDLIFE

THREATENED AND ENDANGERED SPECIES

Bald Eagle

Considered to be one of the great successes of the ESA, bald eagle populations have made substantial recoveries in recent years. Formerly listed as Endangered, the bald eagle was downlisted to threatened status in the lower-48 states in 1995. In March 1999, USFWS proposed to delist the bald eagle (*Haliaeetus leucocephalus*) throughout its entire range (Federal Register 1999). A final rule on the delisting proposal has not yet been issued, and the species remains protected under the ESA.

Bald eagles nest in three primary areas in Idaho. These areas include the North and South Forks of the Snake River in eastern Idaho; the North Fork of the Payette River; and the Pend Oreille and Kootenai drainages of the Idaho Panhandle. Other nesting territories are scattered at much lower densities throughout southern Idaho (Beals and Melquist 1999). Forty-seven territories were known to be active in North Idaho in 2002, of which 35 nests successfully fledged young (Spicer 2002).

Wintering bald eagles tend to be highly mobile and opportunistic in their use of habitat patches. Some sites may not be used for several years, others only under particular conditions. Solitary wintering bald eagles have been observed occasionally along the Lower Priest River in the southeastern portion of the project area (USFS 2003a). These birds were most likely transients, and there are no known winter roosts or congregation sites in the area.

A bald eagle nest has been documented on the Lower Priest River, approximately 1,000 meters northeast of the project area. Although the nest has been active in recent years, nest occupancy was not checked in 2002 (Spicer 2002) or 2003 (personal communication, Layser 2003), and it is not known whether the nest is currently active.

Gray Wolf

Gray wolves are present on the IPNF as well as on non-federal lands. In 1994, the USFWS determined that wolves south of Interstate 90 should be considered part of the Central Idaho Experimental Population; whereas wolves north of Interstate 90 would receive full protection in accordance with provisions of the ESA. The Quartz-Cottonwood project area is north of Interstate 90, therefore, wolves that may use habitat in the project area would be fully protected as "Endangered" under the ESA.

Solitary or small groups of wolves have been observed near the project area, west of SH 57, on a number of occasions since the mid-1990s (personal communication, Layser 2003). While habitat in the vicinity of the project area is probably capable of accommodating wolves, there are no confirmed wolf packs in the region (personal communication, Roberts 2003).

Grizzly Bear

Grizzly bears on the IPNF are considered part of the Selkirk/Cabinet-Yaak grizzly population. The Selkirk grizzly population, which numbers only about 25 bears, is found in the northern Selkirk Mountains north of the project area. The project area is not in the grizzly bear recovery zone and there are no grizzly bears known to be present in or near the Quartz-Cottonwood road system. The Binarch Pit falls within an IPNF-designated area of known bear occurrence, and grizzly bears have been observed in and near the site (personal communication, Layser 2003).

Canada Lynx

Lynx tend to be solitary animals that use early successional plant communities at high elevations for foraging and mature to old-growth forests with downed trees for denning. The abundance and distribution of lynx are closely linked with snowshoe hares, their main prey (Ruggiero et al. 2000). In winter, lynx do not appear to hunt in openings, where lack of above-snow cover limits habitat for snowshoe hares (Ruediger et al. 2000). Generally, lynx prefer to forage in forest stands that are from 10 to 30 years old, with a high density of young conifers or branches that protrude above the snow. Large open areas, whether human-caused or natural are usually avoided (Ruggiero et al. 2000).

As directed by the federal Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000), the USFS has delineated lynx analysis units (LAUs) for portions of Idaho that would be affected by the proposed action. LAUs do not depict actual lynx home ranges, but their scale approximates the size of an area used by an individual lynx (i.e., 25-50 square miles).

Lynx have been documented on several occasions within 2 to 4 miles of the Quartz-Cottonwood road system (USFS 2003a). Although the core project area is well outside of any LAU, the Binarch Pit is located within the Upper West Branch LAU. The rock pit site is located on the eastern boundary of the LAU, immediately adjacent to Highway 57, a heavily traveled road.

The Binarch site represents less than 1 percent of the land area within the LAU and is classified as non-lynx habitat.

Woodland Caribou

Caribou are found in the Selkirk Mountains in the northern portions of the IPNF. Once numbering as many as 100 animals, in 2000 only about 34 caribou remained in the Selkirks, despite population augmentation efforts between 1987 and 1999. The analysis area is not in the caribou recovery zone and there are no caribou known to be resident in or near the area. Three caribou (a bull, cow, and calf) were observed on the ridge above the Binarch Pit during the winter of 1996-1997 (personal communication, Layser 2003). One of the caribou had been recently translocated, and was likely still assimilating to the ecosystem. The group was considered transient to the area.

SENSITIVE SPECIES

Sensitive wildlife species are identified by the Regional Forester for which population viability may be a concern as evidenced by:

1) Notable current or predicted downward trends in population numbers or density.
2) Notable current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Fourteen sensitive species are known or have potential to occur on the Kaniksu National Forest (Appendix B) and are discussed in this section. There is little or no suitable habitat for the following seven species in the project area: common loon, harlequin duck, peregrine falcon, flammulated owl, black-backed woodpecker, wolverine, Townsend's big-eared bat, northern bog lemming, boreal toad, northern leopard frog, and Coeur d'Alene salamander. These species may use the project area occasionally, but effects on suitable habitat, if it occurs, would be avoided through project design protections for aquatic habitats. Due to the minimal likelihood of occurrence within the project area, these species are not analyzed further. Supporting rationale is included in the project file.

Northern Goshawk

The Northern goshawk's breeding habitat consists of mature forest patches used for nesting and prey acquisition (Johansson et al. 1994). Large diameter trees in the moist forests of the southern portion of the project area may provide suitable nesting habitat. The stands of dry conifers, such as lodgepole and ponderosa pine in the northern portion of the project area are less likely to support goshawk nesting.

Northern goshawks have been observed in the project area during the summer breeding season (USFS 2003a). An active nest was found west of FSR 334 in 1993. A second nest found in 1994 was within 800 meters of the 1993 nest site and was likely an alternate nest site within the same territory.

Fisher

Fisher may be present occasionally in the project area and are infrequently present in adjacent suitable habitats. Fisher sign was reported on private land within one mile to the north of the proposed road improvement (USFS 2003a). If fisher were present in the project area, the portion of the area that they inhabit would be a small part of their home range.

MANAGEMENT INDICATOR SPECIES

The IPNF Forest Plan identifies Management Indicator Species (MIS) that are used to judge effects of land management activities on various habitats. MIS include species commonly hunted or trapped which have special management needs that are affected by forest management. Nongame species for which population changes are believed to indicate effects of management activities are also considered to be MIS. On the IPNF, MIS that may be affected by the proposed action include American marten (*Martes americana*), white-tailed deer (*Odocoileus virginianus*), and pileated woodpecker (*Campephilus principalis*).

3.3.3 Environmental Consequences

3.3.3.1 SIGNIFICANCE CRITERIA

This section evaluates the potential for impacts to wildlife resources under the proposed action and no action alternative. Determination of the significance of potential impacts to wildlife resources is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; (2) the proportion of the resource that would be affected relative to its occurrence in the region; (3) the sensitivity of the resource to proposed activities; and (4) the duration of ecological ramifications. Impacts to resources are significant if species or habitats of high concern are adversely affected over relatively large areas or disturbances cause reductions in population size or distribution of a species of high concern.

3.3.3.2 POTENTIAL IMPACTS AND MITIGATION

ALTERNATIVE 1: NO ACTION

Under the no action alternative, use of the Quartz-Cottonwood road system and existing rock sources would remain at current levels. No additional ground disturbance would occur in the project area. Human activity and disturbance to wildlife would remain at or near existing levels. Direct mortality to wildlife may occur through collisions with motor vehicles or hunting, but would not be expected to increase due to specific management actions. Therefore, potential impacts to wildlife resources resulting from current activities would continue to be negligible.

ALTERNATIVE 2: PROPOSED ACTION

Potential effects of Alternative 2 to wildlife and wildlife habitats include noise and human presence during the construction phase of the project; potentially increased human presence on the improved roads; and the modification of wildlife habitat within the road right-of-way (ROW) and rock source sites. There may also be the potential for direct mortality during the construction phase, particularly for cavity-nesting birds within the road ROW and rock source sites.

Noise and increased human presence during road construction could displace elk, forest carnivores, and other species sensitive to these disturbances. If road improvements increase road traffic or access to adjacent wildlife habitat, species sensitive to human disturbance may also be displaced periodically following road improvements. In general, human disturbance due to construction would be short term (i.e., a few months during summer), and subsequent human disturbances on roads and rock sources are expected to be intermittent and localized to previously disturbed areas.

Habitat alteration would be confined to a relatively small area immediately adjacent to the existing roads and within rock sources. Removal of trees, snags, understory vegetation, and riparian vegetation could reduce wildlife habitat in the ROW and rock sources. Such habitat loss would represent a small portion of the habitat available in the project area, and is generally unlikely to adversely affect local or regional populations of resident or transient wildlife species.

Direct mortality of most mobile species would have a low probability of occurring during construction. If construction coincides with the nesting season of canopy- or cavity-nesting birds or mammals (e.g., owls, woodpeckers, nuthatches, chickadees, squirrels, or chipmunks), some mortality of nestlings could occur. Wildlife species that are not tolerant of human disturbance would be unlikely to nest within the ROW. Wildlife mortality due to construction is not likely to have an adverse effect on local or regional populations of cavity- or canopy-nesting wildlife, particularly for common species or species sensitive to human presence.

The two existing rock quarries (Peterson Road and Jasper) have been affected by previous quarrying and timber harvest activities. Most portions of these sites are devoid of vegetation, and the vegetation that is present is characteristic of disturbed sites. Wildlife species that are dependent on late seral stage forests, peatlands, or wetlands would not generally occur in or near these rock quarries.

The proposed rock quarry north of McAbee Falls is near the forest edge, adjacent to an historic rock quarry, camping area, and trailhead. Bald eagles have occasionally been observed on the adjacent Lower Priest River in winter (USFS 2003a), but winter use is short and duration and coincides with the time of year during which road construction and rock quarrying would not occur. No special status species were detected in this area during summer 2003 surveys for northern goshawks and bald eagles. Because the site is generally unsuitable for most special status wildlife species, as well as for other species requiring mature forests or wetlands, local or regional populations of these species would not be affected by the small amount of habitat loss or human disturbance associated with development of this rock quarry.

The 25-acre proposed Binarch Pit is primarily characterized by second-growth, moderately dry forest vegetation, primarily small Douglas-fir (*Pseudotsuga menziesii*) trees and ceanothus shrubs with low stem densities, low understory cover, and open canopy. Despite the generally low quality of wildlife habitat at the site, Canada lynx, grizzly bears, woodland caribou, and gray wolves have been observed in the area, and small numbers of these species may travel through the site or forage there for short periods of time.

Special Status Species

Bald Eagle

Current guidelines for minimizing disturbance to bald eagles call for an area of no disturbance within 400 to 800 meters of an active nest. The known bald eagle nest in the area is approximately 1,000 meters from the northern boundary of the project area, and would be unlikely to be affected by the proposed action. An additional, unoccupied nest on the Lower Priest River approximately 400 meters away from the ROW may be used by bald eagles, but is more likely to be used by osprey. If construction occurs during the bald eagle nesting season (May-August), it could reduce nesting success at this nest; however, the nest is sufficiently distant from the ROW to minimize potential adverse effects to nesting bald eagles or osprey.

Bald eagles nesting in the area may forage in the reach of the Lower Priest River immediately adjacent to the ROW in the eastern portion of the project area. The Montana Bald Eagle Management Plan (1994) considers foraging habitat within 2.5 miles of a nest site to be within the home range for nesting eagles. The Lower Priest River adjacent to FSR 334 is within 2.5 miles of the known bald eagle nest. These eagles may be temporarily displaced from foraging areas during the construction phase of the proposed action.

Use of local nests during the nesting season should be verified prior to the construction phase of the proposed action. If an active nest is documented within the project area, road improvement operations and related activities should be suspended within 1 mile (1,600 meters) of active nest sites between February 1 and July 15 to reduce risk of nest abandonment or foraging displacement caused by disturbance. Activity restrictions could be removed if nests were determined to be inactive.

Grizzly Bear

Grizzly bears are unlikely to be present within the project area. The proposed project area, except for the Binarch Pit, lie outside of designated recovery areas or areas of known occurrence. The proposed Binarch Pit lies within an area of known occurrence, but would not result in a change of access potential. Consequently, there would be no change in road densities or core habitat. There would be no impacts to the prey base for grizzlies locally or regionally. The proposed action would thus have no effect on grizzly bears.

Gray Wolf

Gray wolves are unlikely to be present within the project area, and the proposed action would not affect wolf denning or hunting areas. There would be no impacts to the prey base for wolves locally or regionally. The proposed action would thus have no effect on gray wolves.

Canada Lynx

Although not confirmed within the project area, lynx may occur in areas affected by the proposed action. If the proposed action could potentially alter lynx habitat, effects to the species may occur. However, there is no lynx habitat within the area of potential effect (USFS 2003b).

Ground and vegetation disturbance resulting from road improvement activities would occur in confined areas within the ROW and rock source areas. The area of potential effect, except for the proposed Binarch Pit, lies outside of LAUs or important travel corridors. Development of the proposed Binarch Pit would alter 25 acres of vegetation within an LAU; however, the entire Binarch Pit is comprised of vegetation types classified as non-lynx habitat (USFS 2003b). Development of the pit would therefore not increase the amount of unsuitable habitat within the LAU. The location of the site adjacent to a high-use highway limits its suitability as connectivity habitat, and meaningful use of the immediate area by lynx is likely precluded.

Conservation measures identified by the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) would be implemented to minimize or avoid potential impacts to local and regional lynx populations.

Woodland Caribou

Woodland caribou are unlikely to be present within the project area except as occasional transients, and the proposed action would not affect caribou habitat. There would be no impacts to the availability of forage or cover habitat for caribou locally or regionally. The proposed action would thus have no effect on woodland caribou.

Northern Goshawk

Goshawks are likely to occur in the project area in low nesting densities. Removal of moist cedar-fir and lodgepole pine forest could affect nesting and foraging habitat for goshawks. Habitat loss would be limited to areas previously disturbed. Goshawks are generally intolerant of human presence and activity and are unlikely to nest near existing roads. The proposed action may impact individuals or small areas of goshawk habitat, but would not contribute to a trend toward federal listing or cause loss of viability to the population or species.

Use of historical nest sites during the nesting season should be verified prior to the construction phase of the proposed action. If a nest is occupied, a 30-acre no-activity buffer will be established around the nest tree. For nest sites that lie outside treatment areas within a disturbance risk area, road improvement operations and related activities would be suspended within one-quarter mile (approximately 400 meters) of known nest sites during March 15 - August 15 to reduce risk of nest abandonment caused by disturbance. Activity restrictions can be removed after June 30 if nest site is determined to be inactive or unsuccessful.

Fisher

Fisher may use habitat in the project area as part of larger home ranges. The species is generally secretive and sensitive to human presence, and are therefore unlikely to occur within the ROW of existing roads. Conversion of habitat within the ROW and rock sources would not likely affect the prey base or potential denning habitat for fisher. The proposed action may impact individuals or small areas of fisher habitat, but would not contribute to a trend toward federal listing or cause loss of viability to the populations or species.

Pileated Woodpecker

Pileated woodpeckers are an indicator of Douglas-fir forest, typically using large diameter Douglas-fir and ponderosa pine (*Pinus ponderosa*) trees. Pileated woodpeckers are present in the project area. Road improvements and rock source development could remove some potential pileated woodpecker nesting habitat. Because vegetation within the ROW, and its associated utility as pileated woodpecker habitat, has already been compromised by removal of canopy and use of the road, it is unlikely that pileated woodpeckers nest within the ROW. The proposed action may affect individuals or small areas of habitat that could be used by pileated woodpeckers, but would not substantially alter pileated woodpecker habitat in the area. Therefore, the distribution and abundance of this species within the project area would not change under the proposed action.

American Marten

Although martens have not been detected in the project area, suitable marten habitat occurs in the area. Late-successional forest supports a potentially abundant prey base as well as down, woody material that provides habitat for small mammals, prey for marten, and structure for movement under deep snow. Road improvements and rock source development could remove some potential marten foraging and denning habitat. The proposed action may affect individuals or small areas of habitat that could be used by American marten, but would not substantially alter marten habitat in the area. Therefore, the distribution and abundance of this species within the project area would not change under the proposed action.

White-tailed Deer

Historically, white-tailed deer flourished in the 1800s, but by the early 1900s their populations were reduced to low numbers due to over exploitation by trappers, miners, and settlers. White-tailed deer populations have since rebounded to being the most abundant big game species in northern Idaho.

Winter is the most limiting and stressful period for big game. It is during this period when forage is scarce and travel is energetically very expensive because of snow accumulations. Consequently, in an effort to ameliorate conditions, deer locate themselves on lower elevations, concentrating on smaller, more confined areas known as critical winter range.

While white-tailed deer are present in the area of potential effect, the area is located at elevations above and outside recognized critical winter range boundaries. Critical winter range is generally found at lower slopes and on valley floors below 3,000 feet where snow accumulations are moderate enough to sustain white-tailed deer populations.

Since white-tailed deer populations are prospering in north Idaho and the proposed action would not impact critical winter range areas, the distribution and abundance of this species within the project area would not change under the proposed action.

3.3.3.3 CONSISTENCY WITH FOREST PLAN AND OTHER REGULATIONS

All alternatives would be consistent with the Forest Plan standard (II-11) for providing for recovery as outlined in species recovery plans or other management plans and guidelines for federally listed species such as the grizzly bear; and Forest Plan Standard (II-9) for maintaining viable populations of all species.

All of the alternatives would comply with the ESA of 1973 as amended since no alternative would lead a threatened or endangered species toward extinction.

3.3.4 Cumulative Effects

Cumulative effects discussions include past actions in combination with other relevant present, ongoing, and reasonably foreseeable actions, regardless of the source. The appropriate scale or geographic bounds for a cumulative effects analysis relates to an area that would be influenced by the proposed action or reasonable alternative, and may be different for different species. For lynx, the Lynx Conservation Assessment and Strategy has determined that the LAU is a suitable cumulative effects analysis area for lynx. For most of the other species analyzed, the cumulative effects analysis area is defined as the Quartz and Cottonwood Creek drainages, and the Binarch Pit, and Jasper, Peterson Road, and North McAbee Falls quarry sites.

Past activities in the project area include timber harvest on private, state, and federal lands. Road construction and maintenance has also occurred.

The following list describes ongoing projects on National Forest lands within the cumulative effects analysis area that could have the potential to influence wildlife and wildlife habitat. Design criteria have been included in Chapter 2.0 to avoid or minimize these potential effects.

ONGOING AND REASONABLY FORESEEABLE ACTIONS

Weed treatment and monitoring – Weed treatment activities apart from those listed as mitigation by design features (section 2.7) would be subject to available funding. Any such activities would follow guidelines established in the Priest Lake Noxious Weeds Control Project Final EIS (USFS 1997). No impacts beyond those described in the Final EIS are expected to occur.

Chips Ahoy Forest Restoration Project – This project includes vegetation treatments on as many as 1,680 acres, with construction of as many as 2.5 miles of temporary roads. Vegetation treatments would include mechanical and chemical treatments. A Draft EIS evaluating potential project effects was released in February 2004. Under design characteristics for the project, all known locations of special status species will be buffered. Impacts at the project level would not be expected to lead to the decline of any threatened, endangered, and sensitive species. Because of the scope of the Chips Ahoy and Quartz-Cottonwood projects, and with measures designed to protect sensitive wildlife resources, cumulative impacts from these projects would not be significant at the regional scale.

With implementation of design restrictions and mitigations for the Quartz-Cottonwood road improvement project, the proposed action would not affect most wildlife species with potential to occur in the project area. Timber harvest, forest restoration, noxious weed control, and road maintenance all have potential to affect wildlife and habitat within the cumulative effects analysis area. However, because of the scope of the project and its expected low level of impact based on project design and mitigation, the Quartz-Cottonwood project would not contribute to cumulative impacts beyond the project area.

3.4 VEGETATION

3.4.1 Definition of Resource

Vegetation includes all existing terrestrial plant communities but excludes discussion of species with special protection status. The composition of plant species within a given area often defines ecological communities and determines the types of wildlife that may be present. Wetlands are considered special category sensitive habitats and are subject to regulatory authority under Section 404 of the Clean Water Act and EO 11990, Protection of Wetlands.

Special status plant species are defined as those currently federally listed, proposed for listing, or candidates for listing as endangered or threatened under ESA. It also includes species designated as sensitive by the IPNF or the USFS Regional Office, or by the state government. Special status plant species that occur or have potential to occur in the project area are listed in Appendix B; the list is derived from Kaniksu National Forest list of special status plant species. The list includes 3 of the 4 plant species within Idaho listed as either Endangered or Threatened under the ESA and 56 species designated by IPNF as sensitive. Nine of the sensitive plant species are in the genus *Botrychium*, and eight species are sedges (*Carex sp.*).

The regulatory framework providing direction for the protection and management of rare plants and habitat comes primarily from the following sources:

- ESA of 1973 (as amended)
- The NFMA
- IPNF Forest Plan
- Weed Management Plans and Final EISs

Section 7(a) (2) of the ESA of 1973 (as amended in 1978, 1979, and 1982), requires all federal agencies to review all actions authorized, funded, or carried out by them to ensure that actions authorized, funded, and/or conducted by them are not likely to jeopardize the continued existence of any federally listed species, or result in destruction or adverse modification of designated critical habitat for such species.

The NFMA provides for balanced consideration of all resources. It requires the USFS to plan for diversity of plant and animal communities. Under its regulations, the USFS is to maintain viable populations of existing and desired species, and to maintain and improve habitat for management indicator species.

3.4.2 Existing Conditions

3.4.2.1 VEGETATION

The eastern and southern portions of the project area are dominated by moist forest, including western red cedar (*Thuja plicata*) and Douglas-fir (*Pseudotsuga menziesii*). The northern and western portions of the project area are dominated by stands of lodgepole pine (*Pinus contorta*).

Private lands in the northern and western portions of the project area are characterized by an abundance of nonnative and invasive plant species. Riparian vegetation consists of birch (*Betula sp*.), quaking aspen (*Populus tremuloids*), cottonwood (*Populus sp*.), alder (*Alnus sp*.), dogwood (*Cornus sp*.), and willow (*Salix sp*.) in the valley floodplain and mixed conifers in the uplands. The Quartz Creek watershed experienced stand replacement fires from 1926 to 1931 and 20 percent of the watershed have been logged.

Much of the forest bordering the project area roads is young and in closed-canopy state. Understory in those areas is sparse. In other areas, such as the northernmost segment of FSR 239 and 334, lodgepole pine dominates the overstory. Cedar regeneration is often present, occasionally mixed with spruce, but the openness of the canopy results in a shrubby understory. Two of the rock sources, Jasper Quarry Expansion and Binarch Pit, have been previously harvested. The Jasper Quarry site had been burned, with a dense shrub layer.

3.4.2.2 SPECIAL STATUS PLANT SPECIES

The CEQ (40 CFR 1502.2) directs that impacts be discussed in proportion to their significance. Generally, the following guidelines are used for determining the appropriate level of analysis.

No detailed analysis is necessary for species or habitat presumed not to be present within the affected area. No potential habitat for the Threatened species water howellia, Ute ladies'-tresses, or Spalding's catchfly occurs in the project area.

Species or habitat considered present and potentially affected by the proposed actions are carried forward into a detailed discussion and analysis in section 3.4.3. Suitable habitat for deerfern, sensitive moonworts, and other moist forest and wet forest guild sensitive species and Forest species of concern is documented in the project area, and may be impacted by proposed project activities. These species and habitats are analyzed in detail.

FIELD SURVEYS

Assessment of threatened, endangered, and sensitive plant habitat occurrence was accomplished through review of ICDC Element Occurrence Records, vegetation maps, IPNF rare plant habitat guild maps, topographic maps, and field surveys.

Rare plant surveys of the project area were conducted in August and September 2003. All areas within the road ROW and rock pit and quarry sites were evaluated for suitability of habitat for federally listed and IPNF sensitive plants. Surveys were conducted by wetlands scientists and botanists from SAIC and the University of Idaho Stillinger Herbarium.

Although potential rare plant habitat occurs in some areas, only one rare plant was found in the 2003 field surveys. The moss *Rhizomnium nudum* grew in two small patches near the creek above and below FSR 334, west of the Lower Priest River. It is possible that the moss occurs farther upslope and downslope from the road; further surveys are needed to determine the extent of the population in the area.

None of the three threatened plant species with potential to occur were found in the project area. Habitat in the project area is generally unsuitable for *Spiranthes diluvialis*, *Howellia aquatilis*, or *Silene spaldingii*. These species are therefore not carried forward for effects analysis.

THREATENED AND ENDANGERED SPECIES

Ute Ladies'-tresses

Ute ladies'-tresses is a perennial orchid associated with moist environments. *Spiranthes diluvialis* is endemic to moist substrates in wetland or wet meadows associated with springs, lakes, or perennial streams. Occurrence is typically in lightly vegetated, open areas protected from over-grazing (USFWS 1992). Habitat suitable for *Spiranthes* is generally not present in the project area, and field surveys in August 2003 did not find *Spiranthes* plants or suitable habitat in the project area.

Water Howellia

Water howellia (*Howellia aquatilis*) was listed as a threatened species in 1994 under the ESA (USFWS 1994). As the name implies, this is an aquatic species found in lakes and ponds. This species grows in firm consolidated clay and organic sediments that occur in wetlands associated with ephemeral glacial pothole ponds and former river oxbows. This species has the potential to occur within the project area, as populations have been documented from Montana west to the Willamette Valley in Oregon and south to California. To date there has been no documented presence of water howellia near the project area, and the absence of suitable habitat limits the likelihood of occurrence. Neither the species nor suitable habitat were observed during field surveys conducted in August 2003.

Spalding's Catchfly

Spalding's catchfly is a regional endemic and occurs only in eastern Washington, northeastern Oregon, Idaho, and western Montana. Habitat for *Silene spaldingii* consists primarily of open grasslands with a minor shrub component and occasionally with scattered conifers. Although populations of *Silene spaldingii* have been documented in Idaho, the project area does not support the grassland mosaics that comprise suitable habitat for the species. To date, there has been no documented presence of *Silene* near the project area, and the absence of suitable habitat limits the likelihood of occurrence within the project area.

SENSITIVE SPECIES

Sensitive species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or habitat capability which would reduce the species' existing distribution. Several Forest species of concern are also considered; while they are generally not at risk on a rangewide, region-wide or state level, they may be imperiled at the Forest level. Sixty-three sensitive plant species are known or suspected to occur in the Kaniksu portion of the IPNF, which encompasses the Quartz-Cottonwood project area. Fifty-five of the 63 sensitive plant species are vascular plants. The remaining seven are nonvascular mosses, lichens, and one bladderwort. Nine of the sensitive plant species are in the genus *Botrychium*, and eight species are sedges (*Carex sp.*).

Plant species identified as "Forest species of concern" are species which may not be at risk on a rangewide, regional or state scale, but may be imperiled within a planning area, such as a

National Forest (USFS 1997). Forest species of concern are addressed in effects analysis to provide for maintenance of population viability as directed in NFMA.

Sensitive species and Forest species of concern may be assigned to one or more habitat guilds. These guilds are artificial assemblages based on similar habitat requirements and are used to streamline analysis. A list of threatened, endangered, and sensitive plant species by habitat guild and guild descriptions are included in Appendix B.

No documented sensitive plant occurrences were known in the project area prior to 2003. Moist forest habitat suitable for threatened, endangered, and sensitive plants occurs along existing roads in the east and south portions of the project area. Approximately 2,300 acres of moist forest habitat is distributed across the project area, most of it in the interior of the area, outside of the proposed road improvement corridor. A small patch of dry forest (about 20 acres) is found near the intersection of FSR 239 and 416, and small amounts of peatland (less than 5 acres) occur near Quartz Creek, but both of these habitat types occur outside of the area of potential effect for the proposed project.

Species of moist forest habitats that are likely to occur in the project area include deerfern *(Blechnum spicant*), moonworts *(Botrychium lanceolatum, B. minganense, B. paradoxum, B. pinnatum, and B. simple*x), and clustered lady's slipper *(Cypripedium fasciculatu*m). The sensitive species maidenhair spleenwort *(Asplenium trichomane*s) may also occur in rock seep microsites within moist/wet forests.

Several of the sensitive species are known only from wet habitats *(Botrychium ascendens, B. crenulatum, B. montanum, B. pedunculosu*m), green bug-on-a-stick moss *(Buxbaumia viridi*s), clear moss *(Hookeria lucen*s), and Sierra woodfern *(Thelypteris nevadensi*s).

Moonworts (*Botrychium* species***)***

Moonworts are seedless vascular plants that reproduce from spores and underground rhizomes. Rare moonworts usually occur in wet or moist forest habitat and/or near streams and in soils with well-developed soil mycorrhizae. In the IPNF, plants are most often found on benches in the riparian zone of late-seral forests, though they are also known from moist subalpine habitats, glacial scours, young, regenerated stands, previously disturbed meadows next to game trails, or roadside ditches.

Though the amount of canopy cover is variable between different moonwort sites, the degree of moisture sites have in common suggests that it is an important requirement. Stream flow alteration due to changes in moisture regime may disturb plants and the fungal relationship necessary for reproduction. Zika et al. (1995) noted that in Oregon, logging adjacent to existing moonwort sites has created problems with windthrow and microsite alteration. Moonworts are very sensitive to drought and may not appear in very dry, hot years (Lorain 1990). Striking changes in abundance and age structure in Botrychium populations have been observed from one year to the next (Zika et al. 1995), and are probably related to moisture and the fungal relationship. Due to their small stature and tendency to occur singly or in small groups, and unpredictability of emergence, there is a possibility that moonwort plants could be missed even when field surveys are conducted.

Although no sensitive moonworts were identified during surveys in the project area, the area does contain suitable habitat for these species.

Deerfern (**Blechnum spicant**)

In eastern Washington and northern Idaho, deerfern is disjunct, or separated, from the main range of the species. It is common in coastal forests west of the Cascade Mountains but rare throughout the inland northwest. Plants typically grow in shady, moist mature forests, but appear to tolerate limited soil disturbance and canopy removal (Blake and Ebrahimi 1992).

The effects of harvesting and overstory removal on deerfern are not yet fully understood. Blake and Ebrahimi (1992) noted that deerfern populations in Washington state have withstood timber harvest and related treatment. Road improvement work has the potential to impact deerfern habitat.

Green Bug-On-a-Stick Moss (**Buxbaumia viridis**)

This inconspicuous moss usually occurs on soil or well-rotted logs in moist forest habitats to about 4,000 feet elevation (Lawton 1971). *Buxbaumia viridis* is a short-lived, ephemeral species. It grows as scattered individuals, and many populations consist of only one or a few individuals. Threats to the species include removal of woody debris that could provide suitable habitat and destruction of individuals by tree felling and ground disturbing operations.

Naked mnium (**Rhizomnium nudum**)

Habitat for this moss includes damp forest soil, humus, and creek beds. Threats are similar to those for *Buxbaumia viridis*. The species appears to be shade-dependent, and mitigation recommendations may include maintenance of greater than 70 percent closed-canopy forest habitats for shade (USFS 2004b). Because this moss generally frequents moist riparian areas, it is often protected by standard riparian buffers.

3.4.2.3 NOXIOUS WEEDS

Information on current weed infestations and results of weed management in the project area is derived from observations during field surveys for threatened, endangered, and sensitive species.

Noxious weeds are those plant species that have been officially designated as such by Federal, State or County officials. In Weeds of the West by Whitson et al. (1992), a weed is defined as “a plant that interferes with management objectives for a given area of land at a given point in time.” The Federal Noxious Weed Act of 1974 (Public Law [P.L.] 93-629) defines a noxious weed as “a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States or the public health.” The Idaho Noxious Weed Law defines a “noxious weed” as any exotic plant species established or that may be introduced in the State which may render land unsuitable for agriculture, forestry, livestock, wildlife or other beneficial uses and is further designated as either a state-wide or County-wide noxious weed (Idaho Code 24 Chapter 22).

Exotic plants (weeds) invade disturbed sites and replace native plants. Increases in the distribution and abundance of noxious weeds and other exotic plant species are directly related to disturbed soil and weed seed dispersal. Consequently, activities that disturb soil, reduce canopy coverage, or result in more human traffic (pedestrian or motorized) or wildlife movements would increase the potential for spreading weeds.

During field surveys in August and September 2003, road banks in the project area were seeded in some areas with a mixture of timothy, orchard grass, fescue, clover, and brome. Weeds and bracken fern, an invasive native species, degraded the roadside in many areas. The southern leg of FSR 334 was dominated by bracken fern and spotted knapweed. Hawkweed, spotted knapweed, and diffuse knapweed occur on FSR 416C. Spotted knapweed was common on many stretches of roads, as were other invasive species including tansy, Canada thistle, St. John's wort, oxeye daisy, sulfur cinquefoil, and Kentucky bluegrass. Weed concentrations were high in some areas, but in most cases did not extend beyond the existing road ROW.

The overall IPNF strategy is to contain weeds in currently infested areas and to prevent the spread of weeds to susceptible but generally uninfested areas. Weed management activities in the District are guided by the Priest Lake Ranger District Noxious Weed Control Project EIS (USFS 1997). The Record of Decision for the Weed EIS approved weed treatments on approximately 50 acres of land along FSR 334 and 416.

3.4.3 Environmental Consequences

3.4.3.1 SIGNIFICANCE CRITERIA

This section evaluates the potential for impacts to vegetation under the proposed and no action alternatives. Impacts to vegetation are significant if species or habitats of high concern are adversely affected over relatively large areas or disturbances cause reductions in population size or distribution of a species of high concern.

The primary concern for special status plants is that proposed road construction could affect the viability of rare plant populations. Issue indicators used to assess project effects on special status plants are:

- presence of special status plant populations; and
- acres of suitable habitat affected by the proposed action.

3.4.3.2 POTENTIAL IMPACTS AND MITIGATION

ALTERNATIVE 1: NO ACTION

Under the no action alternative, use of the Quartz-Cottonwood road system and existing rock sources would remain at current levels. No additional ground disturbance would occur in the project area. Human activity would remain at or near existing levels. Under this alternative, there would be no direct, indirect or cumulative impacts to any threatened, endangered or sensitive plant species, Forest species of concern, or suitable habitat, since management activities would not change from current levels. There would be no change in the risk or rate of weed spread. Therefore, potential impacts to vegetation under current management programs would be limited to the continuing encroachment by invasive non-native plant species into previously disturbed areas.

ALTERNATIVE 2: PROPOSED ACTION

Potential effects of the proposed road improvement to rare plants and rare plant habitats include ground disturbance and loss of potential rare plant habitat within the road ROW and rock source sites during the construction phase of the project, as well as potentially increased encroachment of invasive plant species in and around the road ROW and rock source sites.

Trees would be removed along existing roads and in rock sources within the project area. Native understory vegetation, including forbs, grasses, and shrubs, would likely regenerate along the new road margins.

A small amount of riparian vegetation near Quartz and Cottonwood creeks would be disturbed under the proposed action. Reed canarygrass and other weeds have invaded riparian areas along Quartz Creek; consequently, much of the disturbed riparian vegetation would be nonnative.

Areas of moderately suitable moist forest habitat would be directly impacted under the proposed action. The loss of suitable habitat would not be significant (an estimated 20 acres) relative to the approximately 2,500 acres of similar habitat in the project area. With implementation of features designed to minimize weed introduction and spread (refer to section 2.7), habitat degradation from noxious weeds is not expected to occur.

Special Status Species

Under this alternative, one documented occurrence of a sensitive plant *(Rhizomnium nudum*) would fall within the road improvement corridor. The occurrence is adjacent to FSR 334 on both sides of the road, within a moist forest microsite under a cedar overstory. Road improvement within the current alignment would directly impact this species. Further surveys should be completed to determine the size and distribution of the population at this site. If the population is distributed across a larger area above and below the road, road upgrades within the current alignment would impact a smaller portion of the local population, and the direct or indirect impacts to individual plants would be less likely to reduce the viability of the species within the region. However, if the population is narrowly distributed along the road, road upgrade activities should be relocated to provide a 100-foot buffer to minimize adverse effects to the population. If the road corridor cannot be moved, the plants would be buffered from soil disturbance or canopy removal, but this buffer would be less than 100 feet. It is likely that the buffer would not be sufficient to preclude at least some alteration of environmental conditions (shade, moisture and/or temperature) from "edge effect". Under the mitigation measure of moving the road corridor to avoid the documented occurrence, this alternative would not directly or indirectly affect the known sensitive plant occurrence, and a loss of population viability or trend to federal listing would not be expected. Without mitigation by design, the proposed action would result in moderate impacts to naked mnium, and may lead to a reduction in population viability at the local level. Impacts from the proposed action by itself would not be significant when considered at the watershed scale, and would be unlikely to contribute to a trend toward federal listing.

Moist and wet forests in the eastern portion of the project area support suitable habitat for nonvascular plants, including a number of IPNF sensitive plant species. Many of the rare plants that may occur in these habitats are small, difficult to identify, and emerge unpredictably. It is possible that individuals or populations of plants such as rare moonworts, mnium, or green bug-on-a-stick moss may be present but undetected. These species rely on the moist soil, downed logs, and shade present in moist forest habitats. To the extent practicable, road improvement activities should minimize disturbance or removal of wet and moist forest trees and downed woody debris to protect suitable habitat for the rare plants that may occur in these habitats.

Surveys in 2003 found no rare plant habitat in or near the existing rock quarries (Peterson Road and Jasper) or the proposed Binarch Pit. The proposed quarry north of McAbee Falls was not surveyed in 2003, but is unlikely to support rare plant habitat. Nonetheless, seasonally appropriate surveys should be conducted at this site prior to construction or ground disturbance. If rare plants are found, the boundaries of rock quarrying activities should be modified to provide a buffer around rare plant populations to minimize adverse effects.

Noxious Weeds

There is a risk of weed introduction and spread associated with road improvement. Preventive seeding of native and desired non-native species on all areas disturbed during road improvement would reduce, but not eliminate, the risk of spread. Implementation of mitigation measures (see section 2.7) would reduce the incidence of weed introduction and spread along the proposed road improvement corridor. Biological, chemical, mechanical, and cultural methods of weed control would be used to reduce the risk of week establishment and spread. Gravel or borrow pits to be used during road construction or improvements would be free of new weed invader species (as defined by the IPNF Weed Specialist).

Weed treatment of all routes, service landings, and turnouts would occur prior to ground disturbing activities where feasible. If the timing of ground disturbing activities would not allow weed treatment to occur when it would be most effective, it would occur in the next treatment season following the disturbance. All newly constructed turnouts or other areas of disturbance (including maintenance on existing roads) would be seeded with a weed-free native and desired non-native seed mix and fertilized as necessary. All straw or hay used for mulching or watershed restoration activities would be certified weed-free.

Weed treatment would occur in compliance with the Priest Lake Range District Noxious Weed Control Project EIS (USFS 1997). Implementation of this alternative would not contribute significant direct or indirect effects to the incidence of noxious weed infestation in the project area.

3.4.3.3 CONSISTENCY WITH FOREST PLAN AND OTHER REGULATIONS

A Forest Plan management goal is to "manage habitat to maintain populations of identified sensitive species of animals and plants" (Forest Plan, II-1). A Forest Plan standard for sensitive species is to “manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to Federal listing under the Endangered Species Act” (Forest Plan, II-28). The Forest Plan also identifies the need to “determine the status and distribution of Threatened, Endangered and Rare (sensitive) plants on the IPNF” (Forest Plan, II-18). All alternatives would meet Forest Plan direction for special status plant species.

According to current Forest Plan direction, infestations of many noxious weed species, including knapweed, goatweed and common tansy, are so widespread that eradication would require major programs that are not possible within expected budget levels (IPNF 1987 p. II-7). The Alternative 1 meets Forest Plan direction by not creating disturbance conducive to new noxious weed invasions or spread of existing weed populations. Alternative 2 provides moderate control actions, as required by the Forest Plan, to prevent new weed species from becoming established, through project design, and through monitoring and treatment as specified in section 3.4.3.2, Noxious Weeds.

3.4.4 Cumulative Effects

Analysis was conducted using results of floristic surveys, current population distribution of threatened, endangered, and sensitive species and Forest species of concern in the analysis area and professional judgment. The cumulative effects analysis area includes the Quartz and lower Cottonwood Creek watersheds, as well as the Peterson Road, Jasper, Binarch, and North McAbee Falls rock sources. Cumulative effects analysis on private lands was based on the assumption that highly suitable habitat for sensitive plants occurs on private lands in similar proportion to that on federal lands. It was further assumed that at least some suitable habitat is or was occupied by sensitive plant species. For the majority of National Forest lands in the cumulative effects analysis area, no management activities are planned other than road maintenance and noxious weed treatment.

Past management activities including timber harvest and road construction and maintenance on private, state, and federal lands in the watersheds were considered in the analysis of cumulative effects. These past activities in suitable habitat within the project area have almost certainly had detrimental impacts to rare moonworts, mnium, and green bug-on-a-stick moss (USFS 2002b). Moss species were not included in the Regional Forester’s sensitive plant list until 1999, and rare plant surveys prior to that time would likely not have identified the inconspicuous *Buxbaumia viridi*s. Past activities may have also adversely affected deerfern; conversely, road construction apparently provided disturbed mineral soil in the road cut that was colonized by deerfern.

ONGOING AND REASONABLY FORESEEABLE ACTIONS

Weed treatment and monitoring – Weed treatment activities apart from those listed as mitigation by design features (section 2.7) would be subject to available funding. Any such activities would follow guidelines established in the Priest Lake Noxious Weeds Control Project Final EIS (USFS 1997). Any herbicide use would follow label guidelines and would not exceed the maximum allowable acres to be treated established in the Final EIS’ adaptive strategy (USFS

1997). Impacts to threatened, endangered, and sensitive plant species were analyzed in that document and its adaptive strategy. No impacts beyond those described in the Final EIS are expected to occur. Surveys would be conducted as necessary before implementation of this activity in highly suitable habitat; identified populations of sensitive plants would be protected.

Chips Ahoy Forest Restoration Project – This project includes vegetation treatments on as many as 1,680 acres, with construction of as many as 2.5 miles of temporary roads. Vegetation treatments would include mechanical and chemical treatments. A Draft EIS evaluating potential project effects was released in February 2004. Under design characteristics for the project, all known locations of rare plants will be buffered. Impacts at the project level would not be expected to lead to the decline of any threatened, endangered, and sensitive species. Because of the scope of the proposed Chips Ahoy and Quartz-Cottonwood projects, and with measures designed to protect documented sensitive plant occurrences, cumulative impacts from these projects would not be significant at the regional scale.

Routine road maintenance activities on open roads in the project area – Future brushing, blading, and plowing of open roads would not be likely to impact any documented sensitive plant occurrences. The location of the naked mnium (*Rhizomnium nudum*) occurrence would be flagged to avoid direct impacts. Removal of canopy over the plant during brushing should be avoided.

Timber harvest on private land adjacent to the project area – Logging may occur over private land that occurs within the Quartz and Cottonwood Creek drainages. This area may support populations of rare moonworts, mnium, green bug-on-a stick moss and deerfern.

Documented rare plant occurrences and most highly suitable habitat for these species would be avoided under the proposed action. Implementation of any project would not, by itself, contribute significant cumulative impacts to deerfern. Planned timber harvest activities on private lands are expected to continue to impact some suitable habitat, with the possibility that some rare plant occurrences may be lost. Ongoing road maintenance and noxious weed treatment are not expected to contribute to cumulative impacts.

3.5 HERITAGE RESOURCES

3.5.1 Definition of Resource

Cultural, or heritage resources represent and document activities, accomplishments, and traditions of previous civilizations, and link current and former inhabitants of an area. The USFS uses the term "heritage resources" to refer to this resource type. Depending on their condition and historic use, these resources may provide insight into living conditions in previous civilizations and may retain cultural and religious significance to modern groups.

Archaeological resources comprise areas where prehistoric or historic activity measurably altered the earth or where deposits of physical remains (e.g., arrowheads, pottery, etc.) have been discovered. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion in the NRHP, an inventory of culturally significant resources identified in the United States. However, more recent structures, such as Cold War-era resources, may warrant protection if they have the potential to gain significance in the future and are considered extraordinary in nature. Traditional cultural resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, biological resources, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

Several federal laws and their implementing regulations have been established to manage cultural resources on federal land. Not all these laws are relevant to every situation that may arise on National Forest System lands. However, they form the foundation from which the USFS formulates its guidelines. These laws include the NHPA, Archaeological and Historic Preservation Act of 1974, American Indian Religious Freedom Act of 1978 (AIRFA) (which has no implementing regulations), Archaeological Resource Protection Act of 1979 (ARPA), and NAGPRA.

The USFS also has guidelines governing heritage resource management on USFS lands. IPNF's Forest Plan (IPNF 1987) states that the Forest will "Manage cultural resources on the Forest to maintain their scientific, social, and historical values." In addition, Forest Plan standards state that: "The Forests' cultural and historic resources will be identified, protected, interpreted, and managed. Project areas will be inventoried and evaluated prior to management activity. State and federal agencies and Indian tribes will be consulted about cultural resource activities and projects within their interest. Specific management direction which incorporate interpretation will be completed for the National Register of Historic Places."

Areas sensitive for the presence of heritage resources of all types are defined as

> Areas with less than 10~ [sic] slope, areas within 1,500′ of a water source, areas with stands of root crops, areas of late summer/fall/winter big game habitat, rock shelters, lake outlets with fishery potential, areas with agricultural land, areas of mineral development, locations of historic-period sites as shown in records, journals, maps, etc. (IPNF 1987:Appendix Q).

The APE for the Quartz-Cottonwood Road Project consists of the road itself and the rock sources included in Alternative 2.

3.5.2 Existing Conditions

Humans have made use of the IPNF and surrounding regions for at least 12,000 years. Through climate changes and associated variations in the availability of resources, human adaptations have left their mark on what is now Kaniksu National Forest (SAIC 2004). Archaeological sites representing Native American prehistory, Kalispel occupation, and Euroamerican activities are present in the vicinity of the Quartz-Cottonwood Road Project.

Historic site types located in the IPNF include cabins and features associated with mining, logging and homesteading. Other site types are associated with Forest management, such as lookouts and work camps.

No Native American sites have been identified in the immediate project vicinity, but such sites are known to exist. The IPNF has refined the Forest Plan's definition of sensitive areas (IPNF 1987; see above) by identifying areas with low, moderate and high probability for the occurrence of prehistoric properties (IPNF 2003e). The criteria for determining the probability for finding this type of site include land forms as well as resource availability. High probability areas include: terrace margins, lake outlets, stream confluences and tributary mouths, lake and river margins, drumlins, moraines, glacial dunes and talus slopes, vertical rock faces and ridges. Locations that are close to water, have good solar exposure, or harbor floral or faunal species important as resources to Native Americans are also considered to have a high probability for this site type.

BACKGROUND RESEARCH

A literature review was conducted to identify cultural resource concerns and information needs particular to the Quartz-Cottonwood area. This research consisted of a review of archaeological records held by the IPNF. This source was used to develop the historical setting (SAIC 2004), and to identify resources and investigations in the area immediately surrounding Quartz-Cottonwood

According to records held by the IPNF, there have been 10 previous archaeological investigations within or near the current APE. According to USFS records, approximately 30 percent of the general project area has been previously surveyed. Additionally, the Quartz-Cottonwood APE including roads and three of the rock sources, was surveyed as part of the background research for this project. The McAbee quarry has not been surveyed; however, if Alternative 2 is selected, survey of this specific part of the APE would be required.

- Jasper Mountain Timber Sale, 1977. Survey took place near the mid-point of the present APE. Site 10-BR-135, a cabin, was recorded during this survey; it is near Segment 4 of the current APE, on privately-owned land.
- West Moores and Jasper Mountain Timber Sales, 1977. Survey took place near the center of the area circumnavigated by the roads of APE. Two historic resources were recorded, consisting of a short segment of corduroy road and cement foundations with raised soil features; both are outside the current APE.
- Jasper Mountain Timber Sale Supplement, 1981. One historic resource (10-BR-290), a mining/logging camp and associated trash dump, was recorded, but it is outside of the present APE.
- Lower Quartz Timber Sale, 1982. Three historic resources were recorded near the current APE: 10-BR-319 (suspension bridge), 10-BR-320 (corral) and 10-BR-321 (barn). During the present survey, 10-BR-319 was found to lie outside the APE. The historic corral, 10-BR-320, was not relocated and may have collapsed and become hidden by vegetation in the 20 years since it was recorded. The historic barn, 10-BR-321, was relocated but has collapsed since its original recording.

- East Lamb Timber Sale, 1982. Survey area was located partially within the same area as the proposed 20-acre Binarch Gravel Pit. One historic resource was recorded, the Binarch Peak Forest Service Lookout (10-BR-317), but it is outside of the current APE.
- Highway 57 Salvage Timber Sale, 1984. Survey took place along Highway 57 on the extreme western boundary of the current APE. No cultural resources were recorded.
- Murray Creek Timber Sale, 1985. Survey took place in a region including the northwest portion of the current APE. Two historic resources were recorded (10-BR-418, a lookout, and 10-BR-419, a camp associated either with logging or homesteading), but they are outside of the current APE.
- Supplemental Survey of the Murray Creek Timber Sale, 1985. Survey took place to the northwest of the current APE. One historic resource was recorded (10-BR-617 is a can dump), but it is outside of the current APE.
- 12-Mile Timber Sale, 1992. Survey took place along Highway 57 and encompasses the extreme western boundary of the current APE. No cultural resources were recorded.
- Peewee Puzzle Timber Sale, 1986. Survey includes area slated for Peterson Road quarry expansion. An unrecorded trail and administrative site are outside of quarry area.
- Archaeologist Specialist Report Quartz-Cottonwood Road Project, 2003. Survey includes all roads and rock quarries within the area of potential effect with the exception of the McAbee quarry and access road. Three historic resources were recorded. Isolate QC-1 is an animal pen. Site QC-2 consists of the remains of a partially collapsed cabin with a cinder block foundation, and is located 20 meters to the north of FSR 334. QCBP-1 is a single crushed milk can located at the proposed Binarch Pit location. None of these resources are considered to be eligible for the NRHP.

According to the records of the SHPO, the IPNF office, and the NRHP website, there are no sites listed on the NRHP within the APE (NRHP 2003).

Of the resources located during these surveys, only four resources are located near or within the APE. Site 10-BR-135 is on private land just outside the road APE. Site 10-BR-320 was not relocated and probably has been destroyed. Site 10-BR-321 has undergone structural decay since its recording. Finally, QC-2 consists of a cabin. Only Site 10-BR-135 is considered to be eligible for the NRHP.

3.5.3 Environmental Consequences

3.5.3.1 Significance Criteria

Criteria used to determine NRHP eligibility for archaeological resources are listed in 36 CFR 60.4. To be eligible, a heritage resource must retain its integrity (authenticity of historic identity). Integrity is identified by the survival of physical characteristics that existed during the property's historic or early Native American period. The resource must have integrity of: location, design, setting, materials, workmanship, feeling, or association. Integrity of design, materials, and workmanship means that the resource's original materials, plan, shape, and design elements remain intact. Integrity of setting means that the surrounding landscape remains largely as it was during the resource's period of significance. Integrity of feeling and association means that the resource retains a link to an earlier time and place and is able to evoke that era. If a property retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture, historical patterns, or engineering design and technology. Those resources whose physical characteristics have been altered, disturbed, or otherwise substantially changed, lack integrity.

In addition to possessing integrity, eligibility for the NRHP requires that heritage resources must meet one of the following criteria:

a. are associated with events that have made a significant contribution to the broad patterns of history; or

b. are associated with the lives of persons significant in the past; or

c. embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction; or

d. have yielded, or may be likely to yield, information important in prehistory and history.

The contents and characteristics of each resource were assessed according to their capacity to yield data useful in addressing the history of the area and region. In addition, the integrity of each resource was considered, including the nature and magnitude of current disturbances, and the manner and degree to which these disturbances affected the ability of a resource to provide significant historical information.

3.5.3.2 POTENTIAL IMPACTS AND MITIGATION

ALTERNATIVE 1: NO ACTION

Under this alternative, there will be no alterations to the Quart-Cottonwoods roads. There will be no widening, no construction of additional turnouts, no resurfacing and no excavation of new gravel sources or expansion of existing gravel sources. Currently, no heritage resources are affected by the roads in the APE. With no changes to the roads, there will be no effect to known heritage resources.

ALTERNATIVE 2: PROPOSED ACTION

Alternative 2 includes 22 miles of road and four rock sources. Under this alternative, the road will be widened and surfaced, probably with aggregate; construction that will occur in some areas could include slight route alterations, additional turn-outs, and culvert installations. In addition, two gravel quarries will be expanded and one new pit and one new quarry will be developed. No NRHP-eligible heritage resources have been identified directly within the road width or rock source locations identified as part of the project, but NRHP-eligible site 10-BR-135 lies at the edge of the area surveyed, on private land. If construction, including equipment staging, is planned for the immediate area of this site, then such activity could adversely affect that site. Recommended mitigations are to avoid the site; should it not be possible to design the road so as to avoid the site, then the USFS will comply with Section 106 of NHPA and develop an impact mitigation plan in consultation with the Idaho SHPO.

No National Register-eligible heritage resources have been identified at either the Peterson or Jasper quarry expansions or the new Binarch Pit. However, the new North of McAbee Falls rock quarry has not been surveyed for heritage resources. If this alternative is selected, compliance with Section 106 of the NHPA will require that this quarry be surveyed for heritage resources before its development. If NRHP-eligible resources are located the USFS will develop a mitigation plan in consultation with the Idaho SHPO.

Locations within the APE with high probability for the presence of prehistoric properties should be monitored during construction. These areas include portions of FSR 334 where the road approaches Priest River, and areas of FSR 416 where Quartz Creek also flows near the road.

If, in the course of construction, previously unevaluated heritage resources are located, construction should stop at that location while the USFS complies with Section 106 by evaluating the eligibility of the resources, and consults with the Idaho SHPO. Should the resources encountered fall under the regulations of NAGPRA, or consist of human remains, the USFS will contact the appropriate authorities to develop a plan of action.

The USFS has followed its consultation procedures for contacting Indian Tribes regarding this proposed action.

3.5.4 Cumulative Effects

The cumulative area of impact for heritage resources consists of the region encompassed by the Quartz-Cottonwood Road Project, and all four rock sources. This analysis includes effects from past, present, and reasonably foreseeable future activities including fire suppression, off road vehicle use, road maintenance, activities on private lands, road decommissioning, livestock grazing, and recreational trails.

Reasonably foreseeable actions or projects in the cumulative area of impact that could affect heritage resources include the Chips Ahoy Forest Restoration project, 57 Bear Paws fuels reduction, Gleason Pine Limited Timber Harvest, and the Lakeface Lamb urban interface fuels reduction project. For all of these projects, design elements will eliminate adverse impacts to heritage resources through avoidance. Should unevaluated heritage resources be located during the undertakings, compliance with Section 106 of the NHPA would mitigate adverse impacts, so that no effects to cultural resources are expected from these projects. As this is also true of both Alternatives 1 and 2 of the Quartz-Cottonwood Road Project, no cumulative effects to cultural resources is expected from USFS actions.

Other forest activities that could affect cultural resources include fire suppression and recreation. Improving this road system should improve access for fire suppression, which could result in a beneficial impact for standing historic structures, as fire crews will be able to reach fires more quickly. Improving the road system, while making travel safer, is unlikely to increase negative impacts to heritage resources.

CHAPTER 4.0 LIST OF PREPARERS

Claudia Druss, Senior Archaeologist
B.A., University of Colorado, 1977
M.A., Anthropology, Idaho State University, 1980
Years of Experience: 23

Jake Fruhlinger, Staff Archaeologist
B.A., Boise State University, 1998
MA., Anthropology, University of Idaho, May 2004
Years of Experience: 10

Lorraine S. Gross, Deputy Project Manager
B.A., Anthropology, Pomona College, 1975
M.A., Anthropology, Washington State University, 1986
Years of Experience: 23

Robert House, Senior Aquatic Scientist
A.A.S. Fisheries and Wildlife Management, Shasta J.C.
B.S. Biology (Fisheries and Wildlife), University of Washington
Graduate Studies, Wildlife/Ecology, Utah State University
Years of Experience: 31

Kathy Lombardi, P.E., Senior Water Resources Engineer
M.S., Civil and Environmental Engineering, University of Wisconsin-Madison, 2001
B.S., Environmental Engineering, Humboldt State University, Arcata, CA, 1994
Years of Experience: 10

Ryan McCluskey, GIS Analyst, Water Resources Engineer
B.S., Environmental Science, University of Idaho, 2001
B.S., Mining Engineering, Virginia Tech, 1996
Years of Experience: 8

Rich McEldowney, Biologist
M.S., Rangeland Ecosystem Science, Colorado State Univ., 1999
B.S., Wildlife Biology, Univ. of Montana, 1993
Years of Experience: 11

Katherine Strickler, Senior Biologist
Ph.D., (expected May 2004) Fish and Wildlife Resources University of Idaho
M.S., Biological Sciences, Stanford University, 1990
B.A., Human Biology, Conservation Biology Concentration, Stanford University, 1986
Years of Experience: 16

Christa Stumpf, Project Manager

B.S., Wildland Management, University of Idaho, 1995

M.S., Forest Resources and Land Use Planning, University of Idaho, 1996

Years of Experience: 7

Kimberly Freeman, Production Manager

Claudia Laughlin, Graphic Artist

CHAPTER 5.0 REFERENCES

Beals, J. and W. Melquist. 1999. Idaho bald eagle nesting report. Idaho Department of Fish and Game, Boise, Idaho. October 1999.

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society, Monograph 6. 275pp.

Bjornn, T.C. 1957. A survey of the fisheries of Priest and Upper Priest lakes and their tributaries, Idaho. Job completion report on Project F-24-R, 1955-57. Idaho Department of Fish and game, Boise, Idaho. 176 p.

Bjornn, T.C., M.A. Brusven, M.P. Molnau, J.H. Milligan, R.A. Klamt, E. Chacho, and C. Schaye. 1977. Transport of granitic sediment in streams and its effects on insects and fish. No. 17, Forest, Range, and Wildlife Experimental Station, University of Idaho, Moscow, Idaho.

Blake, J. and C. Ebrahimi. 1992. Species Conservation Strategy and Monitor Plan for Blechnum spicant (deerfern) for Northern Idaho, Idaho Panhandle National Forests and Clearwater National Forest. U.S. Department of Agriculture Forest Service and Idaho Department of Fish and Game Conservation Data Center. Coeur d'Alene, Idaho.

Bonner County. 1934. Record No. 86684 Right-of-way Deed for Road 334. County Record Book, page 391.

Brennan, T.S., A.M. Campbell, A.K. Lehmann, and I. O'Dell. 2000. Water resources data Idaho, water year 1999, Volume 2. Upper Columbia River Basin and Snake River Basin below King Hill, U.S. Geological Survey Water-Data Report ID-99-1, Boise, Idaho. 440p.

Cavallo, B.J. 1997. Floodplain habitat heterogeneity and the distribution, abundance, and behavior of fishes and amphibians in the Middle Fork Flathead River basin, Montana. M.S. Thesis. University of Montana, Missoula, Montana.

Corsi, Chip. 2003. Fish Biologist. Idaho Department of Fish and Game.

Cross, D. and L. Everest. 1995. Fish habitat attributes of reference and managed watersheds with special reference to the location of bull char (Salvelinus confluentus) spawning sites in the upper Spokane River system, northern Idaho. FHR Currents. Fish Habitat Relationships Technical Bulletin 17, U.S. Department of Agriculture, Forest Service.

Dupont, Joe and N. Horner. In press. Middle Fork East River bull trout assessment. . Idaho Department of Fish and Game, River and Stream Investigations: Job Performance Report, Project F-71-R-27, Boise, Idaho.

Elle, S., R. Thurow, and T. Lamansky. 1994. Rapid River bull trout movement and mortality studies. Idaho Department of Fish and Game, River and Stream Investigations: Subproject II, Study IV, Job Performance Report, Project F-73-R-16, Boise, Idaho.

Federal Register. 1999. Proposed rule to remove the bald eagle in the lower 48 states from the list of threatened and endangered species.

Fraley, J.J. and B.B. Shepard. 1989. Life history, ecology and population status of bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. Northwest Science 63: 133-143.

Fraley, J.J., D. Read, and P.J. Graham. 1981. Flathead River fisheries study. Montana Department of Fish, Wildlife and Parks. Kalispell, Montana.

Goetz, F. 1989. Biology of the bull trout Salvelinus confluentus: a literature review. U.S. Department of Agriculture, Forest Service, Willamette National Forest, Eugene, Oregon.

Haas, G.R. and J.D. McPhail. 1991. Systematics and distribution of Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) in North America. Canadian Journal of Fisheries and Aquatic Sciences. 48: 2191-2211.

Horner, N.J., L.D. Labolle, and C.A. Robertson. 1987. Regional fisheries management investigations. Job Performance Report F-71-R-11. Idaho Department of Fish and Game, Boise, Idaho.

Hortness, J.E. and C. Berenbrock. 2001. Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho, Water-Resources Investigations Report 01-4093, U.S. Department of Agriculture, Forest Service.

House, B. 2003. Observations made during field surveys. August 2003.

Idaho Department of Fish and Game (IDFG). 2001. Comment package to draft Priest River subbasin assessment and TMDL. Idaho Department of Fish and Game, Coeur d' Alene, Idaho.

Idaho Panhandle National Forests (IPNF). 2004. Quarterly Schedule of Proposed Actions. April 2004. North Zone Projects in Priest Lake, Sandpoint, and Bonners Ferry Ranger Districts.

_____ . 2003a. Summary of Forest Plan Programmatic Amendments. http://www.fs.fed.us/ipnf/eco/manage/forestplan/prevamnd.html

_____ . 2003b. Northern Rockies Lynx Amendment. http://www.fs.fed.us/r1/planning/lynx/Briefings/briefing 10-03.pdf

_____ . 2003c. Forest Plan Revision Zone. http://www.fs.fed.us/ipnf/ and http://www.fs.fed.us/kipz

_____ . 2003c. Heritage Guidelines, site Investigation Strategy 2003. Document on file, IPNF.

_____ . 2002. Forest Plan Monitoring and Evaluation Report. http://www.fs.fed.us/ipnf/eco/manage/monitoring/fp2002monrpt.pdf

_____ . 1987. Forest Plan. Land and Resource Management Planning. (http://www.fs.fed.us/ipnf/eco/manage/forestplan/)

_____ . 1982. Idaho Panhandle National Forests Schedule A of Forest Development Road Cooperative Agreement for Bonner County, 1982 Revision.

IDAPA 58.01.02 Idaho Department of Environmental Quality Rules IDAPA 58 Title 1 Chapter 2, Water Quality Standards and Wastewater Treatment Requirements. Idaho Office of the State Auditor, Division of Statewide Administrative Rules: Boise, Idaho.

Inland Native Fish Strategy (INFISH). 1995. U.S. Department of Agriculture Forest Service, FONSI, EA, Appendices for Inland Native Fish Strategy for Intermountain, Northern, and Pacific Northwest Regions. U.S. Department of Agriculture, Forest Service, Washington DC.

Irving, D.B. and T.C. Bjornn. 1984. Effects of substrate size composition on survival of kokanee salmon and cutthroat trout and rainbow trout embryos. Technical Report 84-6. Moscow, Idaho: University of Idaho, Idaho Cooperative Fishery Research Unit.

Jackson, Dan. 2004. Civil Engineer, Priest Lake Ranger District, Idaho Panhandle National Forests, U.S. Forest Service.

Johansson, C., P.J. Hardin, and C.M. White. 1994. Large-area habitat modeling in Dixie National Forest. *In* The Northern Goshawk: Ecology and Management. W. M. Block, M. L. Morrison, and M. H. Reiser (eds.). Proc. Symp. Cooper Ornith. Soc., 14-15 April 1993, Sacramento, California. Studies in Avian Biology 16:50-57.Lahren, Sylvester L. Jr. 1998. In Handbook of North American Indians, Vol. 12: 383-296 Smithsonian Institution.

Klatt, B. 2003. Zone Engineer, Priest Lake Ranger District, U.S. Forest Service.

Lawton, E. 1971. Moss flora of the Pacific Northwest. Hattori Botanical Laboratory, Nichinan, Miyazaki, Japan.

Layser, T. 2003. Wildlife Biologist, Priest Lake Ranger District, Idaho Panhandle National Forests, US Forest Service.

Leathe, S.A. and M.D. Enk. 1985. Cumulative effects of microhydro development on the fisheries of the Swan River drainage, Montana. Volume 1. Summary report prepared for the Bonneville Power Administration, Contracts DE-A179-82BP36717 and DE-A179-82BP39802, Project 92-19.

Leathe, S.A. and P.J. Graham. 1982. Flathead Lake fish food habits study. EPA Final Report R008224-0104. Montana Department of Fish, Wildlife and Parks, Helena, MT.

Lee, D. and others. 1997. Broadscale assessment of aquatic species and their habitats. Pages 1,058-1,496 *in* T.M. Quigley and S. J. Arbelbide, technical editors. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. Vol. IIII. U.S. Department of Agriculture-Forest Service, Gen. Tech. Rep. PNW-GTR-405. Pacific Northwest Research Station, Portland, Oregon.

Leider, S.A., M.W. Chilcote, and J.J. Loch. 1986. Movement and survival of presmolt steelhead in a tributary and the mainstem of a Washington river. North American Journal of Fisheries Management 6:526-531.

Liknes, G.A. 1984. The present status and distribution of westslope cutthroat trout (Salmo clarki lewisi) east and west of the Continental Divide in Montana. Montana Department of Fish, Wildlife and Parks. Helena, Montana.

Lorain, C. 1990. Field investigations of Botrychium subgenus Botrychium (moonworts) on the Idaho Panhandle National Forests. Idaho Department of Fish and Game Conservation Data Center, Boise, Idaho.

Maughan, O.E. 1976. A survey of fishes of the Clearwater River, Northwest Science. 50(2): 76-86.

McPhee, C. 1966. Influence of differential angling, mortality and stream gradient fish abundance in a trout-sculpin biotope. Transactions of the American Fisheries Society. 95: 381-387.

Montana Bald Eagle Working Group. 1994. Montana Bald Eagle Management Plan. 2nd edition. Bureau of Reclamation.

National Register of Historic Places (NRHP). 2003. http://www.historicdistricts.com/welcome.html.

Normann, J.M., R.J. Houghtalen, and W.J. Johnston. 2001. Hydraulic Design of Highway Culverts, 2nd Edition, Federal Highway Administration.

Overton, K.C; S.P. Wollrab; B.C. Roberts; M.A. Radko. 1997. R1/R4 (Northern/Intermountain Regions) fish and fish habitat standard inventory procedures handbook. Gen. Tech. Rep. INT-GTR-346. U.S. Department of Agriculture, Forest Service, Intermountain Research Station. Ogden, Utah. 73p.

Peters, D.J. 1988. Rock Creek Management Survey, Helena, Montana: Montana Department of Fish, Wildlife and Parks. Job Progress Report, Project No. F-12-R-29, Job No. II-a.

Pratt, K. 1985. Pend Oreille trout and char life history study. Idaho Department of Fish and Game, Boise, Idaho. 105p.

Pratt, K.L. 1984. Habitat use and species interactions of juvenile cutthroat trout (*Salmo clarki lewisi*) and bull trout (*Salvelinus confluentus*) in the upper Flathead River Basin. Moscow, Idaho: University of Idaho. M.S. thesis.

Ratliff, D.E. 1992. Bull trout investigations in the Metolius River-Billy Chinook System. Pages 37-44 *in* P.J. Howell; D.V. Buchanan, eds. Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis, Oregon.

Reiser, D.W. and T.A. Wesche. 1979. In situ freezing as a cause of mortality in brown trout eggs. Progressive Fish Culturist 41:58-60.

Reiser, J.R. and T.C. Bjornn. 1979. Habitat requirements of anadromous salmonids. General Technical Report. PNW-GTR-96. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, Oregon. 54 p.

Rieman, B.E. and J.D. McIntyre. 1995. Occurrence of bull trout in naturally fragmented habitat patches of varied size. Transactions of the American Fisheries Society 124:285-296.

_____ . 1993. Demographic and habitat requirements of bull trout. U.S. Department of Agriculture, Forest Service, General Technical Report INT-302. Intermountain Research Station, Boise, Idaho.

Rieman, B.E. and K.A Apperson. 1989. Status and analysis of salmonid fisheries: Westslope cutthroat trout synopsis and analysis of fishery information. Job Performance Report, project F-73-R-11, Subproject No. 11, Job 1, Boise, Idaho: Idaho Department of Fish and Game.

Rieman, B.E., D.C. Lee, and R.F. Thurow. 1997. Distribution, status and likely future trends of bull trout within the Columbia River and Klamath River basins. North American Journal of Fisheries Management 17:1111-1125.

Roberts, D. 2003. Wildlife Biologist, Sandpoint Ranger District, U.S. Forest Service.

Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

_____ . 1985. A stream classification system. In Riparian Ecosystems and Their Management, First North American Riparian Conference, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-120, p. 91-95.

Rothrock, G. 2004. Watershed Coordinator, Department of Environmental Quality, Coeur d'Alene Regional Office.

Ruediger, B., J. Claar, S. Mighton, B. Naney, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment and Strategy. U.S. Department of Agriculture Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, Montana.

Ruggiero, L., K. Aubry, S. Buskirk, G. Koehler, C. Krebs, and J. Squires. 2000. Ecology and Conservation of Lynx in the United States. University of Colorado Press. Boulder, Colorado.

Science Applications International Corporation. 2004. Quartz-Cottonwood Road Project Environmental Assessment Specialist Reports. Prepared by SAIC, Boise, for Idaho Panhandle National Forests, Priest Lake Ranger District.

Shepard, B, K. Pratt, and P. Graham. 1984a. Life histories of west slope cutthroat and bull Trout in the Upper Flathead Lake Basin, Montana Department of Fish, Wildlife, and Parks, Kalispell, Montana.

Shepard, B., S.A. Leathe, T.M. Weaver, and M.D. Enk. 1984b. Monitoring levels of fine sediment within tributaries to Flathead Lake, and impacts of fine sediment on bull trout recruitment. Unpublished paper presented at the wild Trout III Symposium. Yellowstone National Park, Wyoming. On file at: Montana Department of Fish, Wildlife, and Parks, Kalispell, Montana.

Simpson, J.C. and R.L. Wallace. 1978. Fishes of Idaho. University Press of Idaho. Moscow, Idaho.

Spicer, D. 2002. Final 2002 Eagle nest results. Memorandum report to IDFG Bureau of Wildlife. November 27, 2002.U.S. Forest Service (USFS). 1999. Douglas-fir beetle project. Draft Environmental Impact Statement. U.S. Department of Agriculture, U.S. Forest Service, Panhandle National Forests, Coeur d' Alene, Idaho.

State of Idaho. 2003. Priest River Subbasin assessment and total maximum daily load process. Prepared by G.C. Rothroch. State of Idaho, Department of Environmental Quality. Coeur d' Alene Regional Office, Boise, Idaho.

_____ . 2002. Priest River Subbasin assessment and total maximum daily load process. Prepared by G.C. Rothroch. State of Idaho, Department of Environmental Quality. Coeur d' Alene Regional Office, Boise, Idaho.

_____ . 2001. Priest River Subbasin assessment and total maximum daily load process. Prepared by G.C. Rothroch. State of Idaho, Department of Environmental Quality. Coeur d' Alene Regional Office, Boise, Idaho.

Thurow, R. 1987. Evaluation of the South Fork Salmon River steelhead trout fishery restoration program. Lower Snake River fish and wildlife compensation plan. Boise, Idaho: Idaho Department of Fish and Game. Job Completion Report. Contract No. 14-16-0001-86505.

United States Fish and Wildlife Service (USFWS). 2002. Bull trout (*Salvelinus confluentus*) recovery plan: Chapter 3, Clark Fork River Recovery Unit. U.S. Fish and Wildlife Service, Portland, Oregon.

_____ . 1998. A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale - Draft.

_____ . 1994. Endangered and Threatened Wildlife and Plants: Final Rule to List the Plant *Howellia aquatilis*, Water Howellia, as a Threatened Species. Federal Register 35860-35864.

_____ . 1992. Endangered and Threatened Wildlife and Plants: Final Rule to List the Plant *Spiranthes diluvialis*, Ute Ladies'- Tresses, as a Threatened Species. Federal Register 2048-2054.

United States Forest Service (USFS). 2004a. Record of Decision, Forest Plan Amendments for Motorized Access Management Within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones. Kootenai, Lolo and Idaho Panhandle National Forests.

_____ . 2004b. Chips Ahoy Draft Environmental Impact Statement. Priest Lake Ranger District, Idaho Panhandle National Forests.

_____ . 2003a. Priest Lake Wildlife Observations Database. Priest Lake Ranger District, Idaho Panhandle National Forests. October 21, 2003.

_____ . 2003b. Priest Lake GIS Database. Priest Lake Ranger District, Idaho Panhandle National Forests.

_____ . 2002a. Curlew National Grassland Final Environmental Impact Statement. <http://www.fs.fed.us/r4/caribou-targhee/projects/curlew_feis/chapter1/issues.htm> February 19, 2004.

_____ . 2002b. Canyon Creek Research Project Environmental Assessment. Priest Lake Ranger District, Idaho Panhandle National Forests.

_____ . 2000. Draft table from Kaniksu geographic watershed assessment. U.S. Department of Agriculture, U.S. Forest Service, Panhandle National Forests, Coeur d' Alene, Idaho.

_____ . 1999. Douglas-fir beetle project. Draft Environmental Impact Statement. U.S. Department of Agriculture, U.S. Forest Service, Panhandle National Forests, Coeur d'Alene, Idaho.

_____ . 1997. Priest Lake Noxious Weed Control Project. Final Environmental Impact Statement. Priest Lake Ranger District, Idaho Panhandle National Forests.

_____ . 1995. "Forest Service Handbook [FSH] 7709.58 – Transportation System Maintenance Handbook, Amendment No. 7709-58-95-1, Effective July 28, 1995." http://www.fs.fed.us/im/directives/fsh/709.58,10.txt 2/20/2004.

_____ . 1993. Record 424224, Easement for Individual Existing Road, 334.

_____ . 1992a. Road Log/Condition Survey: Gleason Macabee Falls. From 7/30/92. M. Hansen.

_____ . 1992b. Quartz-Cottonwood PFSR Project, Road logs from 5June02. D.L. Jackson

_____ . 1989. Road Log/Condition Survey: Quartz Creek. From 9/85. M. Hansen.

_____ . 1985a. Record 311710, Easement for Individual Existing Road, 334.

_____ . 1985b. Road Log/Condition Surveys: Cottonwood Creek. From 9/16/89. Leiser/Baker.

Watson, G. and T.W. Hillman. 1997. Factors affecting the distribution and abundance of bull trout: and investigation at hierarchical scales. North American Journal of Fisheries Management 17:237-252.

Weaver, T.M. and J.J. Fraley. 1991. Fisheries habitat and fish populations. Flathead basin forest practices, water quality and fisheries cooperative program. Flathead Basin Commission, Kalispell, Montana.

Weaver, T.M. and R.G. White. 1985. Coal creek fisheries monitoring study no. III. Montana state Cooperative Fisheries Research Unit. Bozeman, Montana. 94p.

Whitson, T.D., L.C. Buril, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee, and R. Parker. 1992. Weeds of the West. Western Society of Weed Science, Jackson, Wyoming.

Williams, Mary. 2004. Forest Archaeologist, USFS.

Wydowski, R.S. and R.R. Whitney. 1979. Inland fishes of Washington. University of Washington Press [not paged]. Seattle, Washington.

Zika, P.F., R. Brainerd and B. Newhouse. 1995. Grapeferns and moonworts (Botrychium, Ophioglossaceae) in the Columbia Basin. A report submitted to the Eastside Ecosystem Management Project, U.S. Forest Service, Walla Walla, Washington.

APPENDIX A
FISHERIES CHECKLIST

APPENDIX A FISHERIES CHECKLIST

Table A-1. Checklist for Documenting Environmental Baseline and Effects of Road Construction in the Lower Priest River on Relevant Indicators for Bull Trout

DIAGNOSTICS/ PATHWAYS	POPULATION AND ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
Subpopulation Characteristics: Subpopulation Size			X		X	
Growth and Survival			X		X	
Life History Diversity & Isolation			X		X	
Persistence & Genetic Integrity			X		X	
Water Quality: Temperature			X		X	
Sediment/Substrate			X		X	
Chemical Contaminants/ Nutrients	X				X	
Habitat Access: Physical Barriers	X				X	
Habitat Elements Large Woody Debris		X			X	
Pool Frequency and Quality		X			X	
Off-channel Habitat		X			X	
Refugia		X			X	
Channel Conditions & Dynamics: Width to Depth Ratio		X			X	
Streambank Condition	X				X	
Floodplain Connectivity		X			X	
Flow/Hydrology: Change in Peak/Base Flows		X			X	
Drainage Network Increase		X			X	
Watershed Conditions: Road Density & Location		X			X	
Disturbance History			X		X	
Riparian Reserves			X		X	
Disturbance Regime			X		X	
Integration of Species and Habitat Conditions		X			X	

Table A-2. Checklist for Documenting Environmental Baseline and Effects of Road Construction on Quartz Creek in the Lower Priest River on Relevant Indicators for Bull Trout

DIAGNOSTICS/ PATHWAYS	POPULATION AND ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
Subpopulation Characteristics: Subpopulation Size						
Growth and Survival						
Life History Diversity & Isolation						
Persistence & Genetic Integrity						
Water Quality: Temperature	X				X	
Sediment/Substrate		X			X	
Chemical Contaminants/ Nutrients	X				X	
Habitat Access: Physical Barriers			X		X	
Habitat Elements Large Woody Debris	X				X	
Pool Frequency and Quality	X				X	
Off-channel Habitat	X				X	
Refugia	X				X	
Channel Conditions & Dynamics: Width to Depth Ratio	X				X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology: Change in Peak/Base Flows	X				X	
Drainage Network Increase	X				X	
Watershed Conditions: Road Density & Location		X			X	
Disturbance History		X			X	
Riparian Reserves		X			X	
Disturbance Regime		X			X	
Integration of Species and Habitat Conditions		X			X	

Table A-3. Checklist for Documenting Environmental Baseline and Effects of Road Construction on Cottonwood Creek in the Lower Priest River on Relevant Indicators for Bull Trout

DIAGNOSTICS/ PATHWAYS	POPULATION AND ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
Subpopulation Characteristics: Subpopulation Size						
Growth and Survival						
Life History Diversity & Isolation						
Persistence & Genetic Integrity						
Water Quality: Temperature	X				X	
Sediment/Substrate		X			X	
Chemical Contaminants/ Nutrients	X				X	
Habitat Access: Physical Barriers	X				X	
Habitat Elements Large Woody Debris		X			X	
Pool Frequency and Quality		X			X	
Off-channel Habitat		X			X	
Refugia		X			X	
Channel Conditions & Dynamics: Width to Depth Ratio		X			X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology: Change in Peak/Base Flows	X				X	
Drainage Network Increase	X				X	
Watershed Conditions: Road Density & Location		X			X	
Disturbance History		X			X	
Riparian Reserves		X			X	
Disturbance Regime		X			X	
Integration of Species and Habitat Conditions		X			X	

Table A-4. Checklist for Documenting Environmental Baseline and Effects of Road Construction on Murray Creek in the Lower Priest River on Relevant Indicators for Bull Trout

DIAGNOSTICS/ PATHWAYS	POPULATION AND ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
Subpopulation Characteristics: Subpopulation Size						
Growth and Survival						
Life History Diversity & Isolation						
Persistence & Genetic Integrity						
Water Quality: Temperature	X				X	
Sediment/Substrate		X			X	
Chemical Contaminants/ Nutrients	X				X	
Habitat Access: Physical Barriers	X				X	
Habitat Elements Large Woody Debris		X			X	
Pool Frequency and Quality		X			X	
Off-channel Habitat		X			X	
Refugia		X			X	
Channel Conditions & Dynamics: Width to Depth Ratio		X			X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology: Change in Peak/Base Flows	X				X	
Drainage Network Increase		X			X	
Watershed Conditions: Road Density & Location		X			X	
Disturbance History		X			X	
Riparian Reserves		X			X	
Disturbance Regime		X			X	
Integration of Species and Habitat Conditions		X			X	

APPENDIX B
SPECIAL STATUS WILDLIFE AND PLANT SPECIES

APPENDIX B SPECIAL STATUS WILDLIFE AND PLANT SPECIES

Table B-1. Special Status Wildlife Species Known or With Potential to Occur in Bonner and Boundary Counties, Idaho (Page 1 of 2)

Scientific Name *Common Name*	*State*	*Federal*	*USFS Reg. 1*
Birds			
Gavia immer Common Loon	SC		S
Histrionicus histrionicus Harlequin Duck	GSC		S
Haliaeetus leucocephalus Bald Eagle	E	LT	
Accipiter gentilis Northern Goshawk	SC		S
Falco peregrinus anatums Peregrine Falcon	E		S
Otus flammeolus Flammulated Owl	SC		S
Picoides albolarvatus White-headed Woodpecker	SC		S
Picoides arcticus Black-Backed Woodpecker	SC		S
Mammals			
Corynorhinus townsendii Townsend's Big-Eared Bat	SC		S
Synaptomys borealis Northern Bog Lemming	SC		S
Martes pennanti Fisher	SC		S
Gulo gulo luscus North American Wolverine	SC		S
Canis lupus Gray Wolf	E	LE	
Ursus arctos Grizzly Bear	T	LT	
Lynx canadensis Canada Lynx	GSC	LT	
Rangifer tarandus caribou Woodland Caribou	E	LE	

Table B-1. Special Status Wildlife Species Known or With Potential to Occur in Bonner and Boundary Counties, Idaho (Page 2 of 2)

Scientific Name ***Common Name***	***State***	***Federal***	***USFS Reg. 1***
Amphibians			
Bufo boreas boreas Boreal Toad	SC		S
Plethodon idahoensis Coeur d'Alene Salamander	SC		S
Rana pipiens Northern Leopard Frog	SC		S

Table B-2. Kaniksu Threatened and Sensitive Species by Habitat Guild (Page 1 of 2)

Status and Species	*Common Name*	*Rare Plant Guild*
Threatened[1]		
Howellia aquatilis	water howellia	Aquatic
Spiranthes diluvialis	Ute ladies'-tresses	Deciduous Riparian
Silene spaldingii	Spalding's catchfly	Dry Forest (grassland inclusion)
Sensitive[2]		
Andromeda polifolia	bog rosemary	Peatland
Asplenium trichomanes ssp. trichomanes	maidenhair spleenwort	Rock seeps in Moist/Wet Forest
Aster borealis = aster junciformis[2]	rush aster	Peatland
Astragalus microcystis	least bladdery milkvetch	Dry Forest
Betula pumila v. glandulifera	dwarf birch	Peatland/Deciduous Riparian
Blechnum spicant	deerfern	Wet Forest/Moist Forest
Botrychium ascendens	upswept moonwort	Wet Forest
Botrychium crenulatum	dainty moonwort	Wet Forest
Botrychium lanceolatum	triangle moonwort	Wet Forest/Moist Forest
Botrychium minganense	Mingan moonwort	Wet Forest/Moist Forest
Botrychium montanum	western goblin	Wet Forest
Botrychium paradoxum	peculiar moonwort	Wet Forest/Moist Forest
Botrychium pendunculosum	stalked moonwort	Wet Forest
Botrychium pinnatum	northwestern moonwort	Wet Foreest/Moist Forest
Botrychium simplex	least moonwort	Wet Forest/Moist Forest
Buxbaumia aphylla	leafless bug-on-a-stick	Subalpine
Buxbaumia viridis	green bug-on-a-stick	Wet Forest
Carex buxbaumii	Buxbaum's sedge	Peatland
Carex chodorrhiza	string-root sedge	Peatland
Carex comosa	bristly sedge	Peatland
Carex flava	yellow sedge	Peatland
Carex leptalea[2]	bristle-stalked sedge	Peatland
Carex livida	pale sedge	Peatland
Carex magellanica ssp. irrigua (C. paupercula)	poor sedge	Peatland
Carex xerantica	dryland sedge	Subalpine
Cetraria subalpina	Iceland-moss lichen	Cold Forest/Subalpine
Cicuta bulbifera	bulb-bearing water hemlock	Aquatic/Peatland
Collema curtisporum	short-spored jelly lichen	Deciduous Riparian
Cypripedium pubescens v. pubescens	yellow lady's slipper	Peatland/Deciduous Riparian
Drosera intermedia	spoon-leaved sundew	Peatland
Cryopteris cristata	crested shield fern	Peatland
Epilobium palustre	swamp willow-weed	Peatland

Table B-2. Kaniksu Threatened and Sensitive Species by Habitat Guild (Page 2 of 2)

Status and Species	***Common Name***	***Rare Plant Guild***
Epipactis gigantea	giant helleborine	Peatland/Seeps
Eriophorum viridicarinatum	green-keeled cotton grass	Peatland
Gaultheria hispidula	creeping snowberry	Wet Forest/Peatland
Hookeria lucens	clear moss	Wet Forest
Hypericum majus	large Canadian St. John's wort	Peatland
Iris versicolor	blue flag iris	Peatland
Lycopodiella inundata	northern bog clubmoss	Peatland
Lycopodium dendroideum	ground pine	Wet/Moist/Cold Forest/Deciduous Riparian
Meesia longiseta	meesia	Peatland
Muhlenbergia racemosa	green muhly	Peatland
Petasites sagittatus	arrowleaf coltsfoot	Peatland
Phegopteris connectilis	northern beechfern	Wet Forest
Polystichum braunii	Braun's holly fern	Wet Forest
Rhynchospora alba	white beakrush	Peatland
Salix candida	hoary willow	Peatland/Deciduous Riparian
Salix pedicellaris	Bog willow	Peatland
Scheuchzeria palustris	pod grass	Peatland
Scirpus hudsonianus	Hudson's bay bulrush	Peatland
Schoenoplectus subterminalis (Scirpus subterminalis)	water clubrush	Aquatic
Sphagnum mendocinum	Mendocine peatmoss	Peatland
Streptopus streptopoides	krushea	Wet Forest/Cold Forest
Traintha occidentalis[2]	short-styled sticky Tofieldia	Peatland
Trientalis europaea (T. arctica)	northern starflower	Peatland
Vaccinium oxycoccos	bog cranberry	Peatland
Pentagramma triangularis	goldback fern	Wet Forest
Romanzoffia sitchensis	Sitka mistmaiden	Subalpine
Rubus spectabilis	salmonberry	Wet Forest
Sanicula marilandica	black snakeroot	Wet Forest/Moist Forest/Peatland
Tellima grandiflora	fringecup	Wet Forest
Utricularia intermedia	mountain bladdorwort	Aquatic

Notes: 1. Based on USFWS Biannual Forest-wide Species List FWS 1-9-03-SP-002 (105.0000).
2. Based on Northern Regional Forester's Sensitive Species List, March 1999.